

Exceptional Events Waiver Request

For Exceptional PM_{2.5} Events
June 18 - 28,
July 1 - 31, and
August 8, 2015
in the Fairbanks North Star
Borough, Alaska

Air Quality Division

Air Monitoring
& Quality Assurance
Program

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Introduction

The Fairbanks North Star Borough (FNSB) covers an area of 7,361 square miles and has a population of approximately 99,639¹. Fairbanks is situated on the banks of the Chena River in

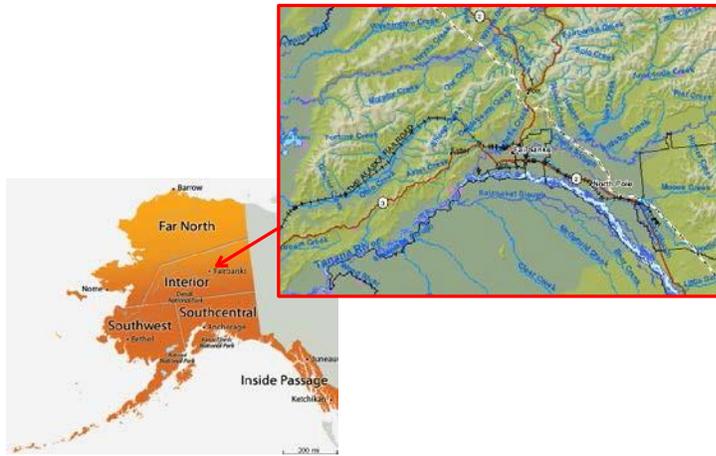


Figure 1. Map of Alaska and inset showing Tanana Valley, Fairbanks, and North Pole.

the upper Tanana Valley in the interior region of the state. North of the FNSB are low hills that border the Tanana Valley (Figure 1). Interior Alaska experiences average winter temperatures ranging between -2°F and -19°F and average summer temperatures between 53°F and 72°F . Temperatures have been recorded as low as -78°F in mid-winter, and as high as 93°F in summer. Average annual precipitation is 11.3 inches and ice fog is common during the winter. FNSB experiences 21 hours of direct sunlight between May 10 and August

2 each summer, and less than four hours of direct sunlight between November 18 and January 24 each winter.

In December of 2009, the Environmental Protection Agency (EPA) designated 244 square miles (3.3%) with an estimated population of over 83,000 residents (83.3%) of the FNSB as a $\text{PM}_{2.5}$ non-attainment area (Figure 2). The non-attainment area encompasses the cities of Fairbanks and North Pole. During the summer months (May through September), the main source of elevated $\text{PM}_{2.5}$ concentrations is smoke from wildland fires. During the winter months (October through March), local home heating emissions are the dominant $\text{PM}_{2.5}$ source², to a much greater extent than industrial or mobile source emissions.

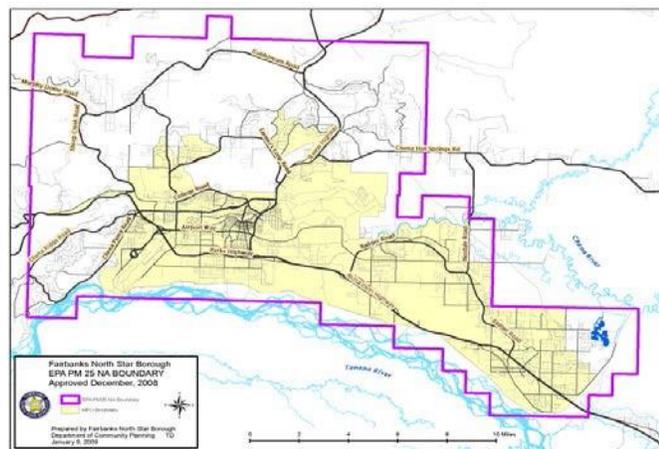


Figure 2. Map of $\text{PM}_{2.5}$ non-attainment area in Fairbanks North Star Borough; purple lines indicate boundary.

¹ <http://www.census.gov/>

² http://dec.alaska.gov/air/anpms/comm/fbks1_pm.htm

During the summer 2015 wildland fire season, air quality monitors in the Fairbanks North Star Borough PM_{2.5} nonattainment area recorded elevated concentrations of PM_{2.5}. The Alaska Department of Environmental Conservation (ADEC) has prepared this document as part of an Exceptional Event Waiver Request (EEWR) to exclude wildland fire emission-caused elevated PM_{2.5} concentrations from federal regulatory decision-making processes under 319(b)(3)(B) of the Clean Air Act.

The Fairbanks North Star Borough (FNSB) Air Quality Program operated three regulatory monitoring sites during the 2015 wildland fire season using both Federal Reference Method (FRM) PM_{2.5} monitors and Beta-wave Attenuation Monitors (BAM) monitoring technologies. The FRM monitoring method results in a 24-hour average PM_{2.5} concentration. The BAM monitors record hourly average PM_{2.5} concentrations and are used to provide the public with timely information about ambient air quality.

FNSB and ADEC use the data from the continuous BAM analyzers only to issue air quality advisories and as a tool for the FNSB in the winter to call burn curtailments. ADEC does not consider the data quality of the BAM data sufficient for regulatory purposes. Data collected using BAM monitors at the regulatory sites are included in this EEWR only as supporting information and for completeness, in the event that EPA considers using the BAM data for regulatory purposes.

This EEWR discusses the data from the following monitors:

- Fairbanks State Office Building, AQS Site ID 02-090-0010
 - FRM 02-090-0010-88101-1 (every third day)
- Fairbanks NCore Site, AQS Site ID 02-090-0034
 - FRM 02-090-0034-88101-1 (every third day)
 - FRM 02-090-0034-88101-2 (every sixth day)
 - BAM 02-090-0034-88501-3 (hourly)
- North Pole Fire Station #3, AQS Site ID 02-090-0034
 - FRM 02-090-0035-88101-1 (every third day)
 - BAM 02-090-0035-88501-3 (hourly)

All of these monitors recorded multiple 24-hour average PM_{2.5} concentrations in excess of both the 24-hour National Ambient Air Quality Standard (NAAQS) of 35 µg/m³ and the annual NAAQS of 12 µg/m³ between June 18 and August 9, 2015. See Table 1 below.

Table 1. 2015 Wildland Fire Season FNSB PM_{2.5} Exceedance Concentrations, µg/m³

June							July						August									
24-Hour PM _{2.5} Concentrations (µg/m ³)							24-Hour PM _{2.5} Concentrations (µg/m ³)						24-Hour PM _{2.5} Concentrations (µg/m ³)									
Date	NCore FRM 1°	NCore FRM 2°	NCore BAM	NPF FRM	NPF BAM	SOB FRM	Date	NCore FRM 1°	NCore FRM 2°	NCore BAM	NPF FRM	NPF BAM	SOB FRM	Date	NCore FRM 1°	NCore FRM 2°	NCore BAM	NPF FRM	NPF BAM	SOB FRM		
18			N/A		22.0		1			26.7			23.5	8			27.7			27.4		
19			8.0		28.3		2	45.2		48.5	45.4	42.1	44.3									
20	8.0		10.2	15.3	11.6	8.8	3			30.4			25.0									
21			25.3		22.2		4			17.9			17.3									
22			78.0		72.1		5	13.8	13.5	57.5	15.4	60.0	14.0									
23	68.8	76.9	76.0	83.2	86.4	68.3	6			13.7			13.6									
24			184.6		160.2		7			201.2			134.5									
25			137.2		96.3		8	60.0		63.0	54.5	54.8	57.1									
26	102.4		109.5	95.0	93.4	95.0	9			13.2			15.1									
27			58.9		42.9		14	14.7		17.7	14.9	13.8	14.3									
28			15.1		8.8		20	4.2		4.5	22.1	3.1	4.6									
<p>Black Bolded Values indicate an exceedance of the Annual NAAQS (12 µg/m³)</p> <p>Red Bolded Values indicate an exceedance of the 24-hour NAAQS (35 µg/m³)</p>							24			14.0			10.8									
							25			13.5			9.4									
							26	15.2		15.2	9.6	7.3	14.6									
							27			15.8		7.8										
							28			22.3		16.6										
							29	15.0	14.5	20.6	11.7	10.3	14.6									
							31			14.0		10.1										

All of these monitors recorded multiple 24-hour average PM_{2.5} concentrations in excess of both the 24-hour National Ambient Air Quality Standard (NAAQS) of 35 µg/m³ and the annual NAAQS of 12 µg/m³ between June 18 and August 9, 2015. ADEC concurs with EPA in that the only dates that currently have regulatory significance are June 23, 26 and July 2, 8 2015, but ADEC has identified all days above the Annual NAAQS for future consideration. ADEC has developed this document to demonstrate that the elevated PM_{2.5} concentrations shown in Table 1 are the result of wildland fire emissions from fires located in Interior Alaska. ADEC requests that EPA exclude all wildland fire-influenced 24-hour average PM_{2.5} concentrations occurring during this event that exceed either the 24-hour or Annual NAAQS PM_{2.5} exceedance concentrations of regulatory significance from regulatory decisions.

This EEWR includes multiple exceedances due to the nature of the event. It is impossible to attribute individual exceedances to specific fires; instead, the wildland fire season is treated as one event. This EEWR follows the steps outlined in the Exceptional Events Rule, finalized in 2016, and includes the elements required in 40 CFR 50.14(c)(3)(iv):

- A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s);
- A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation;

- Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3) (iv)(B) of this section;
- A demonstration that the event was both not reasonably controllable and not reasonably preventable; and
- A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

Conceptual Model

The event began in mid to late June 2015, and lasted through early August. Lightning was the cause of all wildland fires depicted in Figure 3, the 2015 Fire Complex Map. Thirty-one of the 36 fires depicted below ignited between June 19 and 29, 2015. During the 2015 fire season, the fire complex to the west of FNSB burned at varying intensities, the dry conditions and gradient wind flow patterns played a significant role in production and transport of smoke throughout Interior Alaska. Of the 36 fires, only a few were located within a 100 km, while most fires to the west were located some 200 km away from FNSB. Aside from the lightning strikes igniting all fires, the smoke transported by the westerly low and mid-level wind flow was the contributing factor for elevated $PM_{2.5}$ concentrations measured in FNSB. When the winds transitioned out of the east or a frontal system passed over the Interior, FNSB's $PM_{2.5}$ concentrations would drop to more normal summertime readings.

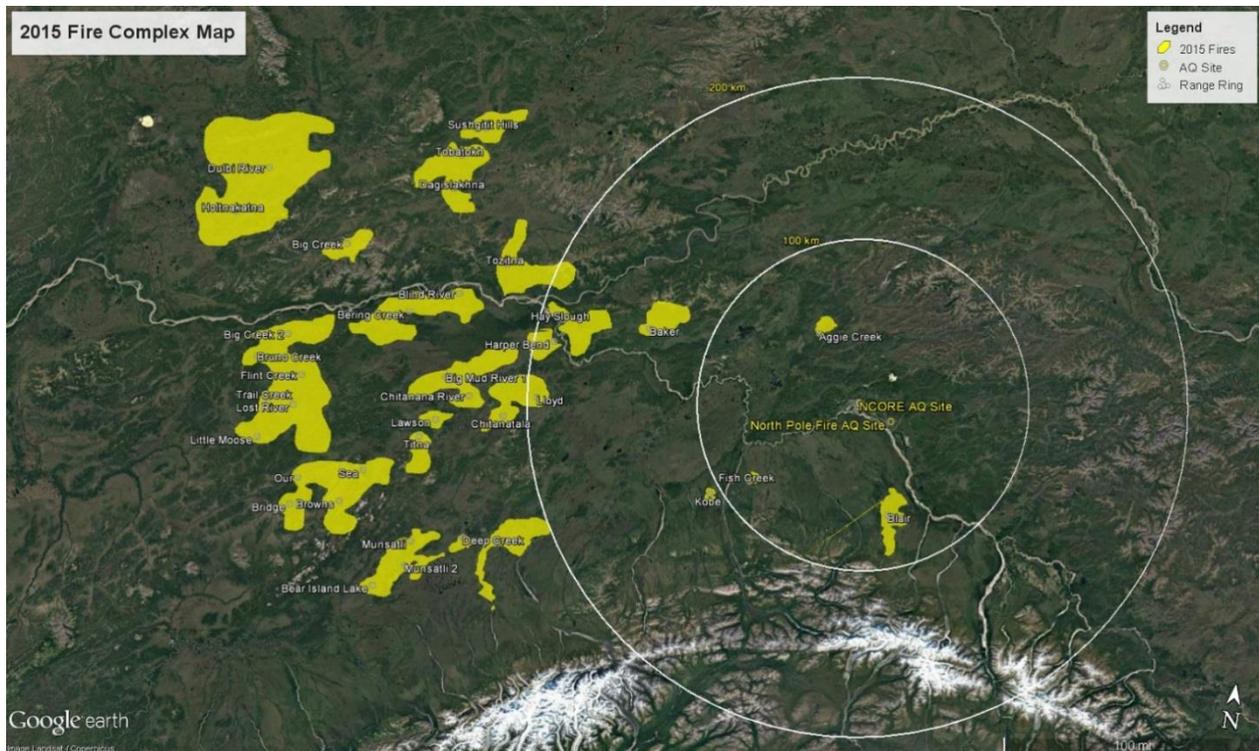


Figure 3. Interior fires during the June/July/August event are in yellow. The shaded fire plots are estimated from satellite burn scars during the 2015 fire season.

Samples collected by FNSB staff from the Federal Reference Method (FRM) monitor every three days, according to EPA’s national monitoring schedule, document the impacts to the area caused by the event. The FRM at the State Office Building (SOB), Fairbanks NCORE, and North Pole Fire (NPF) sites collected samples that had elevated PM_{2.5} concentrations on four of ten samples day between June 20 and July 29, 2015. (See Table 2.)

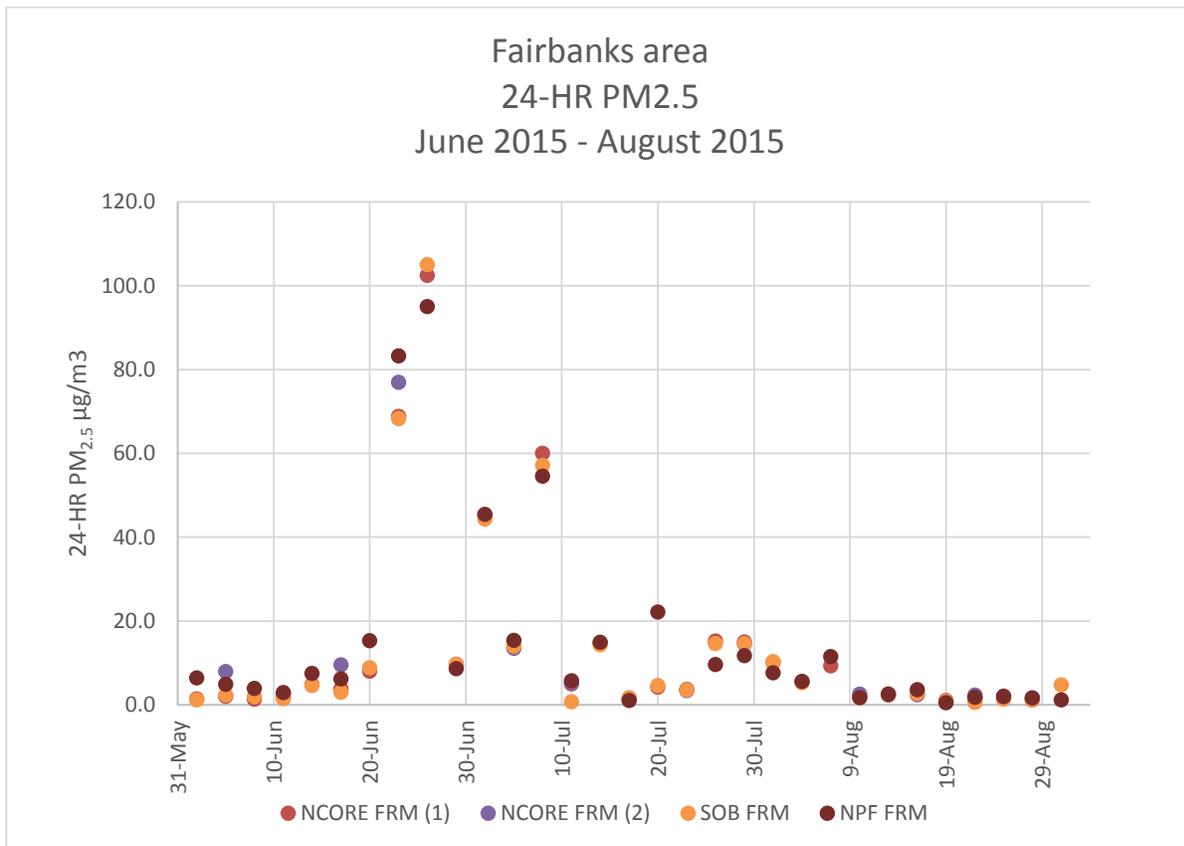
Table 2. FRM PM_{2.5} concentrations in µg/m³ at FNSB NCORE, SOB and NPF sites

June						July						August								
24-Hour PM _{2.5} Concentrations (µg/m ³)						24-Hour PM _{2.5} Concentrations (µg/m ³)						24-Hour PM _{2.5} Concentrations (µg/m ³)								
Date	NCORE FRM 1°	NCORE FRM 2°	NCORE BAM	NPF FRM	NPF BAM	SOB FRM	Date	NCORE FRM 1°	NCORE FRM 2°	NCORE BAM	NPF FRM	NPF BAM	SOB FRM	Date	NCORE FRM 1°	NCORE FRM 2°	NCORE BAM	NPF FRM	NPF BAM	SOB FRM
1			4.0		3.4		1			26.7		23.5		1	10.1		10.9	7.6	5.8	10.3
2	1.4		3.0	6.4	2.6	1.2	2	45.2		48.5	45.4	42.1	44.3	2			5.3		3.2	
3			3.5		7.1		3			30.4		25.0		3			2.9		-1.3	
4			3.1		9.5		4			17.9		17.3		4	5.5	5.5	5.0	5.6	0.8	5.3
5	2.0	7.9	3.5	4.9	6.9	2.3	5	13.8	13.5	57.5	15.4	60.0	14.0	5			7.5		2.6	
6			3.1		2.0		6			13.7		13.6		6			10.1		9.2	
7			4.1		4.2		7			201.2		134.5		7	9.3		9.5	11.5	9.3	N/A
8	1.3		3.3	3.9	2.4	1.9	8	60.0		63.0	54.5	54.8	57.1	8			27.7		27.4	
9			3.8		4.4		9			13.2		15.1		9			10.8		9.6	
10			4.3		6.8		10			6.2		5.9		10	2.1	2.5	2.4	1.7	0.3	1.6
11	1.6	2.5	3.7	2.9	4.6	1.5	11	5.0	5.3	5.6	5.7	4.1	0.7	11			2.8		1.0	
12			3.4		2.5		12			6.0		4.7		12			2.4		2.3	
13			4.9		3.3		13			5.4		2.8		13	2.3		3.2	2.5	0.9	2.6
14	4.8		4.9	7.5	6.0	4.6	14	14.7		17.7	14.9	13.8	14.3	14			4.6		2.4	
15			N/A		5.4		15			1.2		0.0		15			3.1		1.6	
16			N/A		4.3		16			1.0		1.2		16	2.4	2.4	3.5	3.6	1.8	2.7
17	3.8	9.5	N/A	6.2	6.7	3.0	17	1.3	1.6	1.9	1.0	-0.2	1.6	17			1.4		-0.8	
18			N/A		22.0		18			3.3		0.0		18			2.4		-1.5	
19			8.0		28.3		19			3.6		1.7		19	1.0		1.7	0.5	0.0	0.8
20	8.0		10.2	15.3	11.6	8.8	20	4.2		4.5	22.1	3.1	4.6	20			1.8		-0.1	
21			25.3		22.2		21			2.7		1.0		21			3.1		N/A	
22			78.0		72.1		22			1.6		0.2		22	1.5	2.3	2.5	1.8	N/A	0.6
23	68.8	76.9	76.0	83.2	86.4	68.3	23	3.7	3.4	2.3	N/A	1.0	3.5	23			2.0		N/A	
24			184.6		160.2		24			14.0		10.8		24			2.9		1.7	
25			137.2		96.3		25			13.5		9.4		25	2.1		2.7	1.9	-0.4	1.3
26	102.4		109.5	95.0	93.4	95.0	26	15.2		15.2	9.6	7.3	14.6	26			N/A		-2.8	
27			58.9		42.9		27			15.8		7.8		27			N/A		-0.8	
28			15.1		8.8		28			22.3		16.6		28	1.2	1.6	N/A	1.6	-0.4	1.2
29	9.7	9.5	10.5	8.6	7.3	8.6	29	15.0	14.5	20.6	11.7	10.3	14.6	29			N/A		0.6	
30			7.3		6.1		30			8.1		4.4		30			N/A		-0.1	
31							31			14.0		10.1		31	N/A		3.3	N/A	0.7	4.7

While not all ten 24-hour concentrations exceeded the 24-hour National Ambient Air Quality Standard (NAAQS) of 35 µg/m³, all days had at least one site with elevated concentrations, compared to typical non-wildland fire summertime conditions, which exceeded the annual

NAAQS of 12 $\mu\text{g}/\text{m}^3$. During non-wildland fire summer months in the Fairbanks area, the maximum 24-hour average $\text{PM}_{2.5}$ average concentrations range between 3 and 6 $\mu\text{g}/\text{m}^3$ (See Appendix C). Figure 4 shows the spikes in $\text{PM}_{2.5}$ associated with the western fire complex late June through early August.

ADEC flagged all concentrations during this period that were at or above the new annual NAAQS of 12 $\mu\text{g}/\text{m}^3$. Some of the fires impacting the interior of Alaska ignited in mid-June and continued to burn throughout the entire period. Because smoke from numerous fires caused the elevated $\text{PM}_{2.5}$ concentrations, ADEC decided to treat all the days listed in Table 1 as one event. Daily $\text{PM}_{2.5}$ concentrations varied with meteorological conditions and fire growth or suppression. Wind direction was the most important component. Although the $\text{PM}_{2.5}$ concentrations varied, the cause of the elevated $\text{PM}_{2.5}$ levels throughout the entire period was wildland fire smoke. See the Clear Causal Relationship section for a detailed breakout of fire area and smoke ($\text{PM}_{2.5}$) activity.



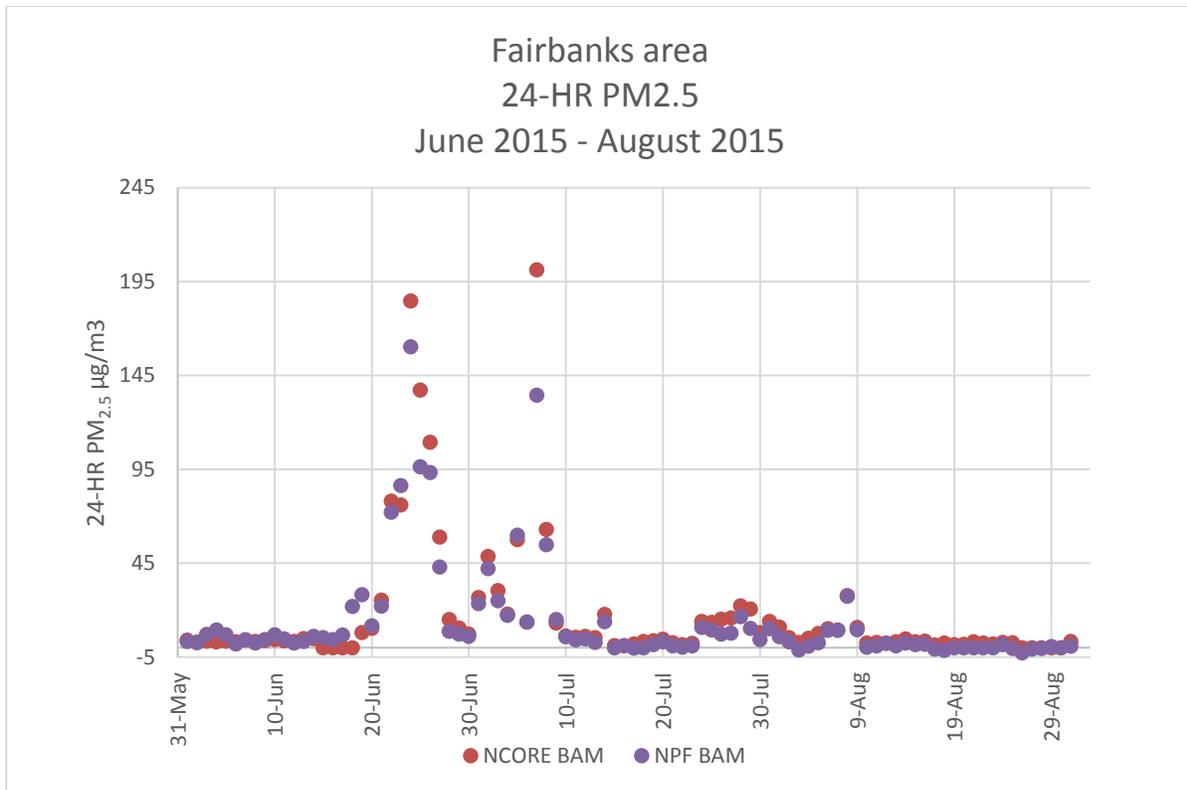


Figure 4. Fairbanks area 24-HR PM_{2.5} June –August 2015

Meteorology

The Alaska Fire Service (AFS) meteorologist summarized the 2015 fires season as follows:

“2015 will be remembered as the busiest fire season in Alaskan history. Though it did not exceed the number of acres burned in 2004, most of the fire activity was compressed into a much shorter window, with almost 40% of the season’s fire starts observed in one week in June. The low snowpack across southern Alaska, compounded by a very warm, dry spring, led to a fairly busy early season and the prepping of fuels to be extremely burnable when the lightning hit during the long days surrounding summer solstice. Fortunately, Mother Nature provided a big assist by moderating the hot and dry early summer with increasing shower activity in both July and August. With so much fire on the ground in mid-July, it seemed unlikely that there wouldn’t be a large resurgence in fire activity later in the summer. But the cooler, damper late summer prevented that from happening. Coming off one of the wettest summers on record in 2014, Alaska’s intense fire season of 2015 seemed quite extreme. The fact is it **was** extreme, and will go down in the history books as the second biggest fire season in Alaska.”

<https://fire.ak.blm.gov/content/Weather Folder/Fire Season Summaries/2015 Fire Season.pdf>

The Tanana monthly meteorological conditions listed below are from the Alaska Center for Climate Assessment and Policy; in partnership with the Alaska Climate Research Center, Arctic

Research Consortium of the United States (ARCUS) Sea Ice Outlook, National Center for Environmental Prediction, and the National Weather Service; are published in the Alaska Climate Dispatch <https://accap.uaf.edu/library/dispatches>. Tanana is located 211 km north west of FNSB and was in the northeast section of the 36 fires to west of FNSB. Tanana's meteorology is the most representative of conditions contributing to the ignition of fires.

“May 2015 was a month of extremes which favored dry conditions, the meteorological conditions required for an active fire season, began setting up very early in the season. Alaska was slightly wetter than normal, the Operational Climatic Data Summary for Tanana, shows a recorded precipitation of 0.96 inches that is 37% above the normal monthly average. According to the Alaska Climate Research Center's Alaska Statewide Climate Summary, Fairbanks daily record temperature events for May were all high events, with no record lows. Tanana recorded a HIGH of 81°F on May 24th and 78°F on May 28th and Fairbanks recorded two new record HIGHS, 77°F on May 17 and 86°F on May 23. These extremes with low relative humidity led to the early establishment of favorable fire weather conditions.”

<http://climate.gi.alaska.edu/Summary/Statewide/2015/May>

“June 2015 continued to reinforce the favorable fire conditions. Alaska experienced state wide mean temperatures below normal for the first few weeks of June but quickly jumped well above normal mean temperatures for the second half of June. Even though Tanana was slightly cooler than normal, with a monthly mean of 56.2°F, or -4.2°F below the long-term mean of 60.4°F. The high temperature for the month was 88°F, recorded on both the 20th of the month. June was also a very dry month with just 1.28 inches of precipitation, 14.7% below the expected amount of 1.50 inches (see Table 3.). Convective activity ramped up in later half of the month, AICC's historical lightning map indicated there were 14,253 ground strikes within 36,100 square miles surrounding Tanana. The combination of dry conditions and lightning were the contributing factors for the 31 fires that were the main PM_{2.5} producers effecting FNSB.”

<http://climate.gi.alaska.edu/Summary/Statewide/2015/Jun>

“July 2015, Alaska continued with it's warmer than normal trend, but again Tanana was slightly under the normal mean temperature of 62.0°F. Tanana's recorded a monthly mean temperature of 59.7°F, which was only 0.3°F below normal mean average temperature and 3.5°F warmer than June's mean temperature. Tanana's high for the month was only 81°F, largely due to the smoke shield blanketing Interior Alaska, keeping the daily high temperatures cooler and morning low temperatures warmer. Just like June, July's precipitation was less than normal, with 1.10 inches, 49.1% below the expected amount of 2.16 inches. Fairbanks saw above average rainfall, 2.78 inches, and 22.3% above the average mean of 2.16 inches (see Table 3).”

<http://climate.gi.alaska.edu/Summary/Statewide/2015/Jul>

“August 2015 in Tanana was cooler than normal, with a monthly mean of 52.2°F, or 3.9°F below the long-term mean of 56.1°F for the month. The highest temperature was 81°F, recorded on the 5th of August. There was a substantial increase in precipitation for the month of August, Tanana recorded 4.68 inches of rain, 45.6% above the 2.55 inches annual norm. For the second straight month Fairbank’s precipitation was above normal, with 2.58 inches, 27.1% above the annual norm of 1.88 inches. All significant rainfall occurred after the middle of the month (see Table 3).”

<http://climate.gi.alaska.edu/Summary/Statewide/2015/Aug>

Table 3. Daily precipitation, Fairbanks Intl. and Tanana Airport

Date		Precipitation, in		Date		Precipitation, in		Date		Precipitation, in	
June		FNSB	Tanana	July		FNSB	Tanana	Aug		FNSB	Tanana
1	0.13	0.00	1	0.23	0.00	1	0.07	0.00			
2	0.00	0.00	2	0.01	0.00	2	0.00	0.19			
3	0.14	0.00	3	0.00	0.00	3	0.00	0.00			
4	Trace	0.00	4	0.00	0.00	4	0.00	0.00			
5	Trace	0.30	5	0.00	0.00	5	0.08	0.00			
6	0.01	0.04	6	0.00	0.01	6	Trace	0.00			
7	0.04	0.21	7	Trace	0.01	7	0.00	0.00			
8	Trace	0.36	8	Trace	0.03	8	0.003	0.00			
9	0.00	Trace	9	0.00	0.00	9	0.02	0.01			
10	0.06	0.22	10	0.00	0.01	10	0.05	0.78			
11	Trace	0.04	11	0.02	0.00	11	0.02	0.16			
12	0.01	0.00	12	0.00	0.00	12	0.05	Trace			
13	0.00	0.00	13	0.00	Trace	13	0.01	0.12			
14	0.00	0.00	14	0.08	Trace	14	0.00	Trace			
15	0.00	0.00	15	0.01	0.04	15	0.06	0.00			
16	0.00	0.00	16	0.05	0.15	16	Trace	0.32			
17	0.00	0.00	17	0.01	0.06	17	Trace	0.12			
18	0.00	0.00	18	0.24	0.15	18	0.36	0.03			
19	0.00	0.00	19	0.08	0.43	19	0.01	1.34			
20	0.07	0.00	20	Trace	0.03	20	0.01	0.02			
21	0.00	0.00	21	0.00	0.00	21	0.04	0.01			
22	0.00	0.04	22	0.00	0.00	22	0.08	0.05			
23	0.00	0.00	23	Trace	0.00	23	0.04	0.09			
24	Trace	0.00	24	Trace	0.00	24	Trace	0.00			
25	Trace	0.00	25	0.09	0.00	25	0.59	0.01			
26	0.14	0.00	26	0.00	0.00	26	0.75	0.72			
27	0.21	Trace	27	0.81	0.15	27	0.17	0.66			
28	0.00	0.00	28	0.26	0.01	28	Trace	0.00			
29	0.00	0.04	29	0.46	0.02	29	0.13	Trace			
30	0.22	0.00	30	0.43	0.00	30	0.01	0.05			
			31	0.00	0.00	31	0.00	0.00			
June			July			August					
Total	1.03	1.28	Total	2.78	1.10	Total	2.58	4.68			
Precip Norms	1.37	1.50	Precip Norms	2.16	2.16	Precip Norms	1.88	2.55			
%Diff	-24.8%	-14.7%	%Diff	+22.3%	-49.1%	%Diff	+27.1%	+45.6%			

The Event was Natural

When the meteorological conditions are favorable and dry fuels are available, as they were in 2015, wildland fires are a common occurrence in Alaska. Since 2004, an average of 1,932,823 acres burn annually. A majority of the acreage consumed lies in Interior Alaska, where the summers are relatively warm and dry. Most wildland fires are ignited by lightning and periodically burn spruce, birch, and cottonwood dominated forests. During the time period June 19 - July 2 2015, a significant lightning event occurred throughout Interior Alaska with an unprecedented 45,542 lightning strikes, see Figure 13. During the same time period, 104,920 lightning strikes occurred statewide.

In 2015, the acreage burned was the second highest of the past 14 years. The AFS 2015 Fire Season report described the 2015 fires season as follows:

“A low snowpack, combined with a very warm spring, set up pre-greened fuels to be extremely dry. Though the snow melted off up to three weeks earlier than normal in some areas, a few periods of scattered showers around the state helped keep fire activity near normal levels through the middle of June. By June 14th, several days of 80+ degree temperatures and RH values into the teens caused rapid drying of fuels with the long daylight hours. Human-caused fires began popping up in earnest around the 15th of the month, with the Sockeye Fire in the Susitna Valley followed by the Card Street Fire in the Soldotna area suddenly ramping up the need for resources in South Central. But the key to the entire season’s high operations tempo was the unprecedented week-long lightning event that began just before the solstice on June 19th, including 3 consecutive days with over 12,000 strikes daily. This seven day period gave rise to nearly 300 fire starts, 90% of which were due to lightning. Burned acreage increased by 3.5 million acres in the two and a half weeks following those starts.”

<https://fire.ak.blm.gov/content/Weather Folder/Fire Season Summaries/2015 Fire Season.pdf>

The Alaska Fire Service determines the cause of each fire at the time the fire occurs. In 2015, the smoke that caused poor air quality in FNSB was from fires that were caused by lightning. During the June/July period, there were 36 lightning-caused fires in Interior Alaska responsible for the FNSB elevated PM_{2.5} concentrations, see Figure 3.

The Event was not Reasonably Controllable or Preventable

The events described above were not reasonably controllable or preventable by the State for several reasons. First, authority over fire protection areas is split into three major jurisdictions (Figure 5) so that smoke from fires outside of the state’s jurisdiction can impact state lands. Second, the events were caused by meteorological conditions (dry weather and high fuel load as described above in the 2015 Fire Season Summary from the Alaska Fire Service) for which the State has no reasonable control. Figure 6 and Figure 7 show the breakdown of Landowners and Management Options for 2015.

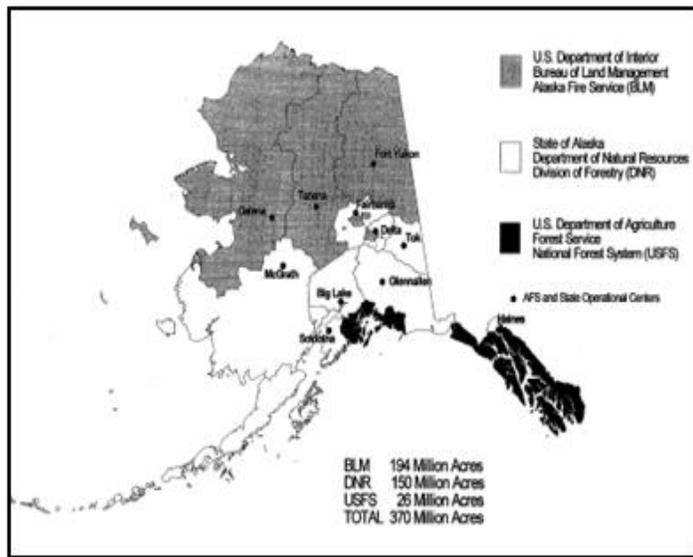


Figure 5. Alaska Wildland Fire Protection Areas

Alaska Fire Service Protection Fires and Acres Burned by Zone and Management										
Option	Critical		Full		Modified		Limited		Totals	
Zone	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Galena	1	42,403	19	115,806	10	202,389	64	873,172	94	1,223,770
Military	2	0	12	72	1	0	22	40,943	37	41,015
Tanana	0	-	14	562,160	5	111,681	75	1,873,732	94	2,547,573
Upper Yukon	0	-	9	3,114	6	64,065	21	175,578	36	242,757
Totals	3	42,403	54	681,152	22	378,135	182	2,963,425	261	4,055,115

Figure 6. Alaska Fire Service Protection Fires and Acres Burned by Zone and Management Option for 2015.

Landowner Agency	Fires	Acres
Bureau of Indian Affairs	1%	0%
Bureau of Land Management	10%	32%
Department of Defense	50%	0%
Native Claims Act Land	15%	11%
National Park Service	3%	2%
Private	23%	0%
State of Alaska	32%	25%
US Forest Service	2%	0%
US Fish and Wildlife Service	10%	29%

Figure 7. Landowner percentage of activity for 2015

AFS and military units work together on control measures as it is known that live fire training will occasionally ignite fires. Control measures include prescribed burns in the spring to reduce fuel loads and to isolate or “black-line” all the training areas and, on days with live fire training, coordination with AFS and military responders. Some prevention measures surrounding FNSB were taken prior to the summer fire season. The Alaska Fire Service was able to carry out mitigation with prescribed burns on the Stuart Creek and Mississippi military reservation ranges, in accordance with the Alaska Enhanced Smoke Management Plan (ESMP) and ADEC 18 AAC 50, Air Quality Control. Both ranges conduct live fire activities throughout the year. Because this training can be an ignition source, these areas are burned and/or “black-lined” each spring. Black-lining is a procedure where the perimeter of an area is burned so if a fire is ignited within the training area it will be contained within the “black-line”.

Figure 8 shows that the estimated amount of PM_{2.5} released during the prescribed burns (left) is much smaller than the amount released during the 2015 wildland fire events (right). Figure 9, shows a more detailed monthly estimate of PM_{2.5} released during the prescribed burns.

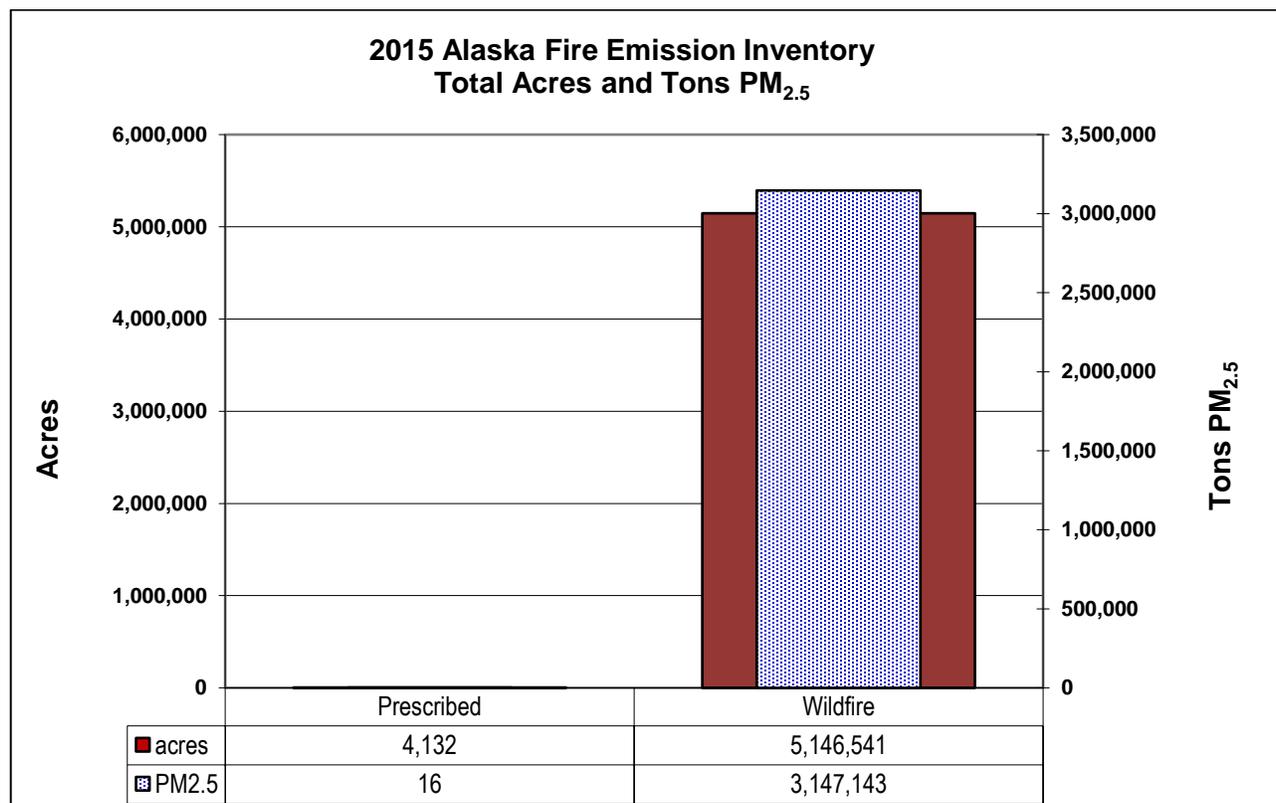


Figure 8. The number of acres burned and the tons of PM_{2.5} produced for both fire types (prescribed and wildland fire) during the 2015 season.

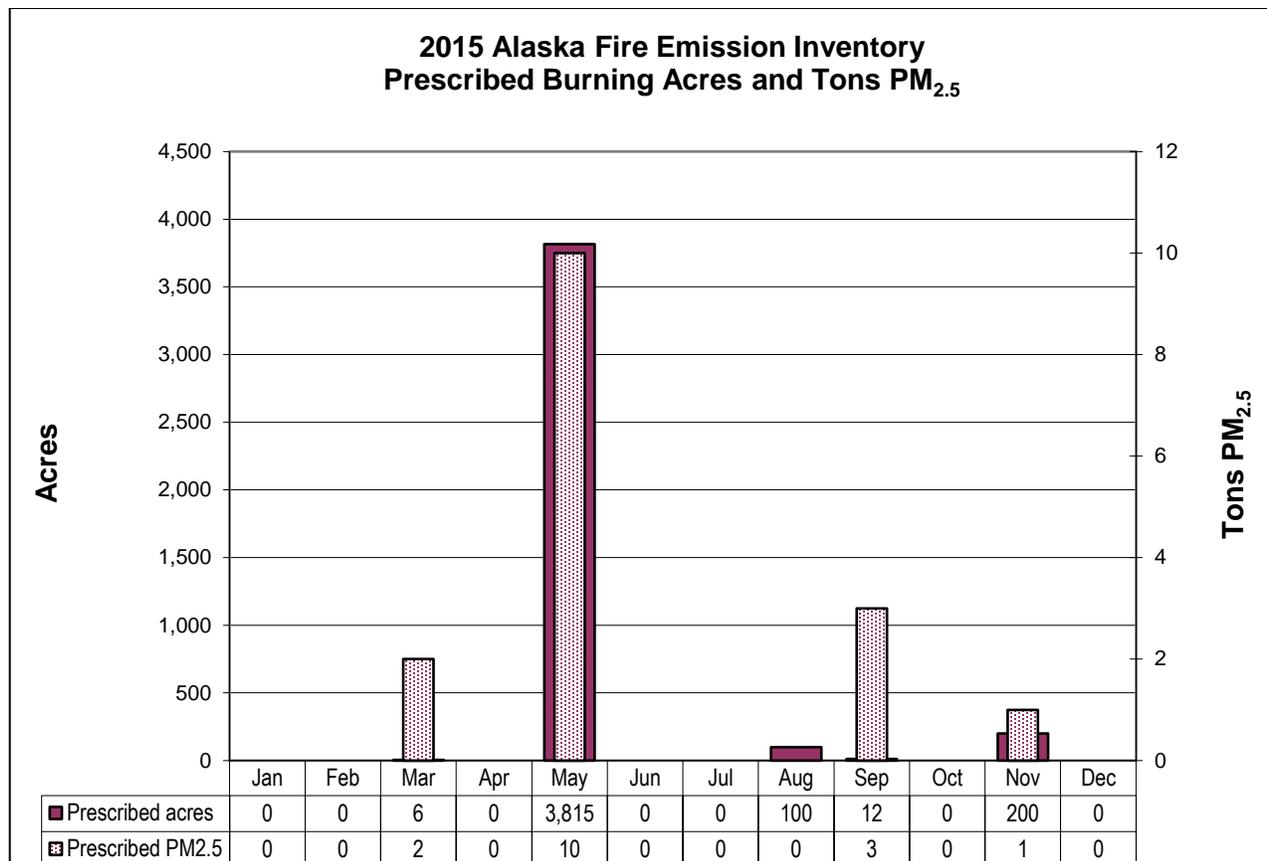


Figure 9. The total prescribed fire emissions in 2015, by month (ADEC, 2015 Alaska Wildfire Emissions Inventory, Figure 2)

The Wildfire Emissions Inventory (ADEC, 2015) documents that most prescribed fires occurred in May 2015 and were conducted by or for the military (Figure 9). Table 4 is a Prescribed Burn and Wildland Fire Acres and PM_{2.5} tonnage breakdown for the past seven years. Also included is the 2015 fire season with monthly Wildland Fire and Prescribed Burn PM_{2.5} emission totals. The prescribed burns conducted in May 2015 did not result in elevated PM_{2.5} concentrations at or above the annual NAAQS of 12 µg/m³. Furthermore, the prescribed burns played no role in the event described in this document.

Table 4. Data from 2015 Alaska Wildland fire Emissions Inventory

Historical Annual Fire Data							
Year	2009	2010	2011	2012	2013	2014	2015
Wildland Fire							
Acres	2,951,598	1,125,499	293,018	286,888	1,320,748	233,530	5,146,541
Tons PM _{2.5}	1,597,149	549,494	180,976	89,560	574,496	152,298	3,147,143
Prescribed Burn							
Acres	3,740	22,136	10,585	12,095	6,549	59,672	4,132
Tons PM _{2.5}	172	227	189	193	260	7,735	16
% of Total Emissions	0.011%	0.041%	0.104%	0.215%	0.045%	4.833%	0.001%
2015 Monthly Fire Data							
Month	May	June	July	August	September		
Wildland Fire							
Tons PM _{2.5}	39.5	207,183	1,046,719	1,731,428	7,464		
Prescribed Burn							
Acres	3,815	0	0	100	12		
Tons PM _{2.5}	10.342	0.000	0.000	0.271	3.443		

Table 5. Multi Year Average Fire Information

	1999 – 2008		2007 – 2015		2015	
	# Fires	Acres	# Fires	Acres	# Fires	Acres
6-year average	512	2,451,813	531	1,352,695		
Annual					766	5,150,67

The two major precursors to an extensive fire season in Alaska are dry meteorological conditions and ignition sources. The main precursor for fires in Alaska – dry meteorological conditions – cannot be reasonably controlled or prevented. The 2015 meteorology is noted for being one of extremes, from record cold, dry conditions to extreme hot, dry conditions. The winter of 2014-2015 left much of the central interior around Tanana with less than half of their average snow pack. Most of the winter precipitation fell in the form of rain, leaving a spring time moisture deficit. Moisture codes were at all-time highs for mid-May. April was warmer than normal for the interior, with temperatures 4-6 degrees higher than recorded norms. In Tanana, the last two weeks of May averaged 70°F with a high of 81°F and continued that trend through June. May was relatively wet with 0.96 inches of precipitation, compared to annual normal

precipitation of 0.70 inches. June began the drying period with only 1.28 inches of precipitation versus the normal of 1.50 inches.

The very dry conditions, the large number of ignition sources (lightning), and the remoteness of Alaska make it nearly impossible to control wildfires. Because of the remoteness and inaccessibility of most areas in Alaska, firefighting is very expensive and time consuming and fires are often only monitored (NOAA, Critical Weather patterns of US, 1999). In fact, many of these fires cannot be controlled or extinguished by human intervention and are only extinguished by the onset of wet weather.

The State of Alaska, the federal land management agencies, and Alaskan tribes developed an interagency plan, the Alaska Interagency Wildland Fire Management Plan (AIWFMP), to address controlling wildland fires. The AIWFMP requires an annual, pre-season land manager(s)/owner(s) review of the fire protection needs on lands under their management authority. Once fire protection needs are determined, the lands are placed in the Critical, Full, Modified, or Limited management option. Option selections are based on land manager/owner(s), values to be protected, and land and resource management objectives.

The fire management strategies selected vary from initial attack and sustained suppression efforts in the critical and full management areas to surveillance in the limited management areas. This categorization and ensuing prioritization ensures that (1) human life, private property, and identified resources receive an appropriate level of protection with available firefighting resources, (2) the cost of the suppression effort is commensurate with values identified for protection, and (3) the ability of land manager(s)/owner(s) to achieve their individual management objectives is optimized.

The AIWFMP also stresses that lightning-caused wildland fires are an important component of the boreal forest and arctic tundra ecosystems, and the complete exclusion of these fires is neither ecologically sound nor economically feasible. The natural role of fire in the environment must be tempered by the need to protect human life and health, private property, developments, and certain valued natural and cultural resources.

During the fire season, suppression resources may become limited due to commitments to numerous initial attack assignments and/or large fires. The pre-fire season assignment of management options establishes priorities for allocation of suppression forces and substantially improves the cost-effectiveness of wildland fire management.

A large portion of the state has been declared as Modified or Limited Maintenance. The Modified management option is intended to be the most flexible option available to land managers/owners. The intent of the Modified management option is to provide a higher level of protection when fire danger is high, the probability of significant fire growth is high, and the probability of containment is low. A lower level of protection is provided when fire danger

decreases, potential for fire growth decreases, and the probability of containment increases. This option should reduce commitment of suppression resources when risks are low. This option also provides increased flexibility in the selection of suppression strategies when risks are high. The Modified option provides a management level between Full and Limited. Unlike Full management areas, the intent is not to minimize burned acres, but to balance acres burned with suppression costs and to accomplish land and resource management objectives.

The Limited management option allows for even less active fire intervention. This category recognizes areas where the cost of suppression may exceed the value of the resources to be protected, the environmental impacts of fire suppression activities may have more negative impacts on the resources than the effects of the fire, or the exclusion of fire may be detrimental to the fire-dependent ecosystem. The Limited management option reduces both long-term suppression risks and costs by reducing the frequency of large fires that may burn out of boundaries of Limited management regardless of the suppression effort. It also reduces current suppression costs and makes suppression goals more attainable in years of drought and intense fire activity. The Limited management option may also be chosen for areas where fire occurrence is essential to the biodiversity of the resources protected and the long-term ecological health of the land. Suppression actions may be initiated to keep a fire within the boundary of the management option or to protect identified higher value areas/sites. Site-specific areas that warrant higher levels of protection may occur within Limited management areas. Appropriate suppression actions to protect these sites will be taken when warranted, without compromising the intent of the Limited management area.

ADEC has implemented the following mitigation strategies to prevent fires and protect public health. Prior to the fire season, mitigation is carried out in accordance with the Alaska Enhanced Smoke Management Plan (ESMP) and ADEC 18 AAC 50, Air Quality Control. ADEC provides a clear and equitable regulatory basis for smoke management in Alaska through the ESMP. ADEC is responsible for reviewing controlled burns for resource management, for reviewing and approving land clearing applications, and for issuing controlled burn approvals. ADEC also ensures that controlled burn applications comply with state air quality regulations (18 AAC 50.065) and ESMP guidelines. While reduction of fuel loads is an important control factor, the ESMP clearly states that “Evaluating potential dispersion of smoke emissions from a project is the single most important component of an effective ESMP.” All controlled burns for resource management or land clearing that are greater than 40 acres in one year must have an approved burn permit. Further, the permit states that the Responsible Authority must notify ADEC at least 24 hours in advance, obtain a favorable dispersion forecast from the National Weather Service, and approval from the ADEC meteorologist. The ADEC meteorologist is responsible for ensuring that air quality standards are not violated during controlled burns. While these controlled burns reduce the fire fuels load, they cannot entirely eliminate the risk.

ADEC issues Air Quality Advisories in accordance with ADEC 18 AAC 50, Air Quality Control

guidance to further protect public health during periods of poor air quality. The ADEC meteorologist issued 60 advisories related to wildland fire smoke between June 2 and August 9, 2015. Between June 18 and August 9, 2015, ADEC issued 27 advisories for the Central Interior region which includes Fairbanks. Other advisories were issued for the southwest portion of Alaska and the southeast area (Appendix B).

The Event Affected Air Quality

The PM_{2.5} 24-hour concentrations measured at the Fairbanks NCORE, SOB, and NPF monitors reflect the unusual fire conditions during the event. Table 6 lists the 24-hour PM_{2.5} concentrations of samples collected by the FRM monitors from June through August 2015. The PM_{2.5} concentrations were significantly higher than the normal average of 4.5 µg/m³ for summer days, June 1 through August 31 for each year, 1999-2015, without wildland fire smoke. The concentrations (as measured by the FRM) exceeded the 24-hour NAAQS of 35 µg/m³ four times during the June-July 2015 period, at the Fairbanks NCORE site. Four days had 24-hour average concentrations above the annual NAAQS of 12 µg/m³ but below the 24-hour NAAQS. During the months of June through August, the PM_{2.5} concentration was fluctuating from higher than average to exceedance (12.1-58.0 µg/m³), with the highest FRM value of 102.4 µg/m³ occurring on June 26, 2015 and the highest BAM value of 201.2 µg/m³ occurring on July 7, 2015 (Table 6).

Table 6. Fairbanks NCORE (FRM/BAM), North Pole Fire (FRM/BAM), and Fairbanks State Office Building (FRM) 24-Hour PM_{2.5} concentrations in summer 2015. Bold red fonts indicates a 24-hour average concentration above the 24-hour NAAQS of 35 µg/m³ and the bold black fonts indicate a 24-hour average concentration above the annual NAAQS of 12 µg/m³.

June	NCORE FRM	NCORE BAM	NPF FRM	NPF BAM	SOB FRM	July	NCORE FRM	NCORE BAM	NPF FRM	NPF BAM	SOB FRM	August	NCORE FRM	NCORE BAM	NPF FRM	NPF BAM	SOB FRM
	1		4.0		3.4			1		26.7			23.5		1	10.1	10.9
2	1.4	3.0	6.4	2.6	1.2	2	45.2	48.5	45.4	42.1	44.3	2		5.3		3.2	
3		3.5		7.1		3		30.4		25.0		3		2.9		-1.3	
4		3.1		9.5		4		17.9		17.3		4	5.5	5.0	5.6	0.8	5.3
5	2.0	3.5	4.9	6.9	2.3	5	13.8	57.5	15.4	60.0	14.0	5		7.5		2.6	
6		3.1		2.0		6		13.7		13.6		6		10.1		9.2	
7		4.1		4.2		7		201.2		134.5		7	9.3	9.5	11.5	9.3	N/A
8	1.3	3.3	3.9	2.4	1.9	8	60.0	63.0	54.5	54.8	57.1	8		27.7		27.4	
9		3.8		4.4		9		13.2		15.1		9		10.8		9.6	
10		4.3		6.8		10		6.2		5.9		10	2.1	2.4	1.7	0.3	1.6
11	1.6	3.7	2.9	4.6	1.5	11	5.0	5.6	5.7	4.1	0.7	11		2.8		1.0	
12		3.4		2.5		12		6.0		4.7		12		2.4		2.3	
13		4.9		3.3		13		5.4		2.8		13	2.3	3.2	2.5	0.9	2.6
14	4.8	4.9	7.5	6.0	4.6	14	14.7	17.7	14.9	13.8	14.3	14		4.6		2.4	
15		N/A		5.4		15		1.2		0.0		15		3.1		1.6	
16		N/A		4.3		16		1.0		1.2		16	2.4	3.5	3.6	1.8	2.7
17	3.8	N/A	6.2	6.7	3.0	17	1.3	1.9	1.0	-0.2	1.6	17		1.4		-0.8	
18		N/A		22.0		18		3.3		0.0		18		2.4		-1.5	
19		8.0		28.3		19		3.6		1.7		19	1.0	1.7	0.5	0.0	0.8
20	8.0	10.2	15.3	11.6	8.8	20	4.2	4.5	22.1	3.1	4.6	20		1.8		-0.1	
21		25.3		22.2		21		2.7		1.0		21		3.1		N/A	
22		78.0		72.1		22		1.6		0.2		22	1.5	2.5	1.8	N/A	0.6
23	68.8	76.0	83.2	86.4	68.3	23	3.7	2.3	N/A	1.0	3.5	23		2.0		N/A	
24		184.6		160.2		24		14.0		10.8		24		2.9		1.7	
25		137.2		96.3		25		13.5		9.4		25	2.1	2.7	1.9	-0.4	1.3
26	102.4	109.5	95.0	93.4	95.0	26	15.2	15.2	9.6	7.3	14.6	26		N/A		-2.8	
27		58.9		42.9		27		15.8		7.8		27		N/A		-0.8	
28		15.1		8.8		28		22.3		16.6		28	1.2	N/A	1.6	-0.4	1.2
29	9.7	10.5	8.6	7.3	8.6	29	15.0	20.6	11.7	10.3	14.6	29		N/A		0.6	
30		7.3		6.1		30		8.1		4.4		30		N/A		-0.1	
						31		14.0		10.1		31	N/A	3.3	N/A	0.7	4.7

PM_{2.5} Concentrations Exceeded Historical Fluctuations (HF)

Summertime PM_{2.5} concentrations in the interior of Alaska are directly related to wildland fires. Analysis of the FRM filter data from FNSB’s State Office Building, NCore, and North Pole Fire showed an average summertime 24-HR concentration of 4.5 µg/m³ when wildland fires were excluded. This value was computed by averaging all data for the months of June through August for 1999 through 2015, after removing any data that had been flagged by ADEC in AQS as an exceptional event or influenced by wildfire emissions. Another measure of concentrations to be expected for summers without appreciable wildland fire smoke impacts is using the 95th percentile of low fire summer concentrations. Table 7 identifies the low fire year’s 95th percentile without removing any flagged data. The years included in the analysis are years with annual burned acreage of less than 1 million acres. The average PM_{2.5} 95th percentile concentration of these seven years (2003, 2004, 2006-2008, 2011, 2012 and 2014) is 9.3 µg/m³.

Table 7. Low fire years PM_{2.5} 95th percentile

FRM	Year	2003	2006	2007	2008	2011	2012	2014	Avg
SOB	95th	7.0	27.4	8.8	6.4	4.3	6.3	4.4	9.3

Wildland fires occur in Alaska every year, primarily between June and September. In the last 14 years the average annual acreage burned by wildland fire in Alaska is 1,886,002 acres. However, the annual acreage burnt can vary greatly, from as low as 43,965 in 1995, to 6,523,816 in 2004 (Table 8). The number of wildland fires and the area burned each year vary with meteorological conditions and locations of fires. Wildland fires are at a minimum during years of wet meteorological conditions and can be quite extensive in years with dry to exceptionally dry conditions. Long periods of dry conditions in May, June, and July 2015 set the system in motion by allowing extensive areas of wildlands to accumulate fire fuels. The high fuel loads and dry conditions led to wildland fires when an ignition source was added.

The fire potential outlook for the 2015 fire season was “above normal” for the southern half of the state in May, then “normal” statewide for the rest of the season. A low snowpack and warm, dry spring led to an early melt and concerns for extremely dry fuels to start the fire season. The outlook for the summer was warmer than normal. Due to the low snowpack and a warmer than normal temperatures for May, Fine Fuel Moisture Codes were at all-time high values, but Alaska lacked significant lightning events which kept fire activity low for the month.

Table 8. Wildland Fire History of Alaska 2002 – 2015, from the “Alaska Fire Season 2013 Wildland Fire Summary and Statistics Annual and Annual AICC situation Reports”⁵

Year	Acres burned	# Fires
2002	2,186,682	544
2003	602,146	465
2004	6,523,816	696
2005	4,649,597	624
2006	270,539	305
2007	649,411	506
2008	103,299	368
2009	2,951,592	527
2010	1,125,419	688
2011	293,018	515
2012	286,888	418
2013	1,320,752	612
2014	293,202	377
2015	5,150,673	766

The monthly climate summaries below are from the Geophysical Institute in Fairbanks⁶.

The May 2015 Climate Summary from the University of Fairbanks Geophysical Institute states: “**Fairbanks**’ mean monthly temperature was recorded as 55.3°F, 5.9°F above the normal 49.4°F. This is the second warmest May observed in Fairbanks’ climate history of more than a century. The mean maximum temperature for the month was 69.2°F, breaking the record for the month by 1.6°F, with the old record set in 1995. The highest temperature for the month was 86°F on the 23rd, which also set a record for that day, breaking the 2002 record by 6°F. One more daily high record was set; on the 17th, the 77°F

observed broke the 1923 record for the day by 1°F. The coldest temperature for the month was 28°F which occurred on the 6th. The 0.29” of precipitation that were measured for the month was just 48% of the expected amount. There was no recorded snowfall, while 0.9” is the normal long-term amount. The highest wind speed was 30 mph from a southwesterly direction on the 16th, while the average wind speed was 4.7 mph.”

The June 2015 Climate Summary from the University of Fairbanks Geophysical Institute states: “**Fairbanks**’ mean monthly temperature was recorded as 59.8°F, 0.6°F below the normal 60.4°F. The coldest temperature for the month was 37°F, which occurred on the 1st and 13th. The warmest temperature was 85°F on the 15th and 19th. The 1.03” of precipitation that was measured for the month was just 75% of the expected amount. The highest wind speed was 29 mph from a southerly direction on the 5th, while the average wind speed was 4.8 mph.”

The first week of June was cooler than normal, by mid-June the temperatures crept back to normal very low relative humidities reported around the Interior and South Central Alaska. The fire season ramped up quickly on June 18th, an unprecedented lightning event began and lasted through the 26th. More than 65,000 lightning strikes were recorded during that period causing 270 ignitions. During the next three weeks, an average of one million acres burned per week.

⁵Wildland Fire Summary and Statistics Annual Report – AICC, Alaska Fire Season 2015

⁶<http://akclimate.org/city-summaries/2015/5>

Figure 10 is a comparison of the PM_{2.5} concentrations for each fire season for the years 2000 to 2015. ADEC defined the fire season as the period from June 1 through August 31 for each year since these dates included all PM_{2.5} exceedances and the major fire periods. “Fire years” are those years where many fires occur on more than one occasion during the year. These fires impact the PM_{2.5} concentrations in FNSB. The summer of 2004 was the worst fire year since record keeping began in Alaska. The data is not completely displayed on this graph since it is such an outlier. If the data were displayed the upper (green) box would be over 280 and the whisker would be well over 700. This would make all other years of data virtually unreadable if it was to be displaced in scale.

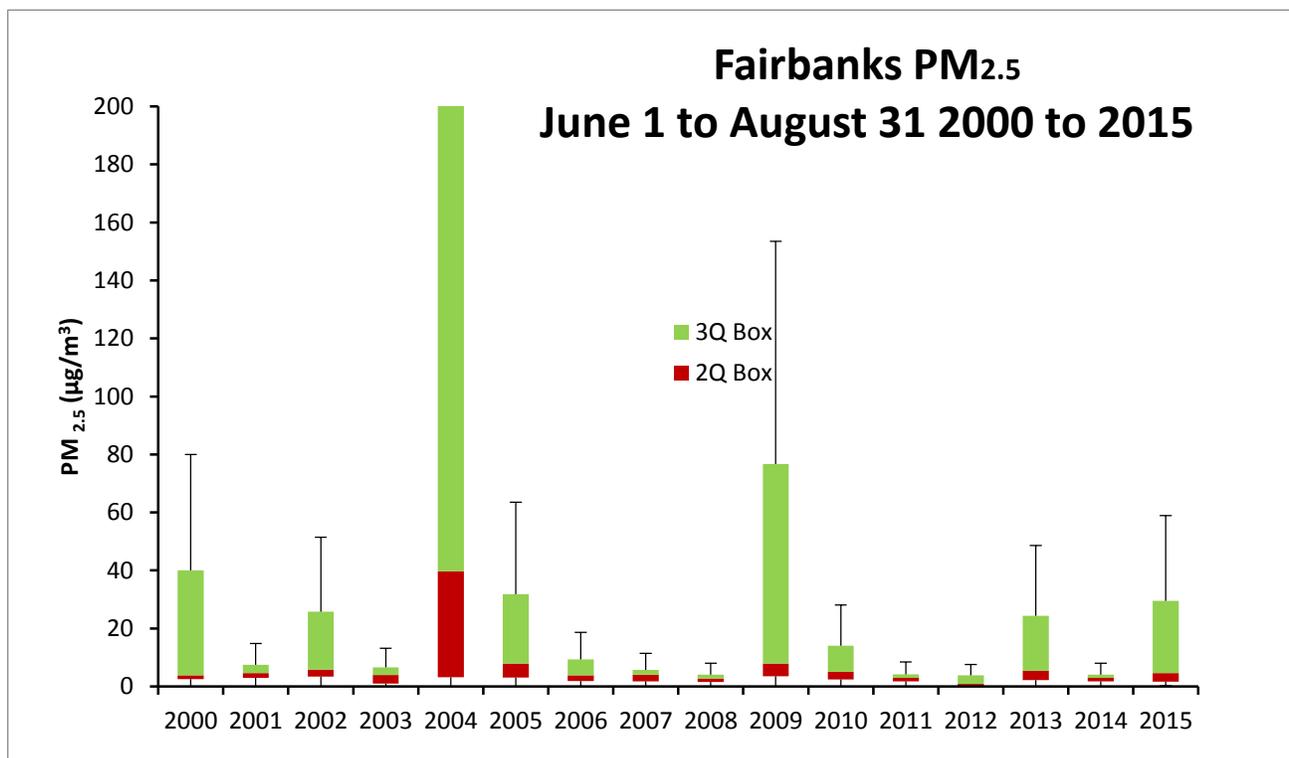


Figure 10. Fairbanks PM_{2.5} for the fire seasons year 2000-2015. The upper box (green) represents data from the median to the 90th percentile. The lower (red) boxes represent data from the median down to the 10th percentile. The “whiskers” indicate the values between the top (bottom) of the box, 90th (10th) percentile to the highest (lowest) values.

2015 had fewer fires and therefore lower PM_{2.5} concentrations than some of the most severe fire years during this period from 2000 on. 2001, 2003, 2008, 2011, 2012 and 2014 were years with few or small fires. The acreage burned in 2015 was above average, with numerous fires within close proximity to Fairbanks.

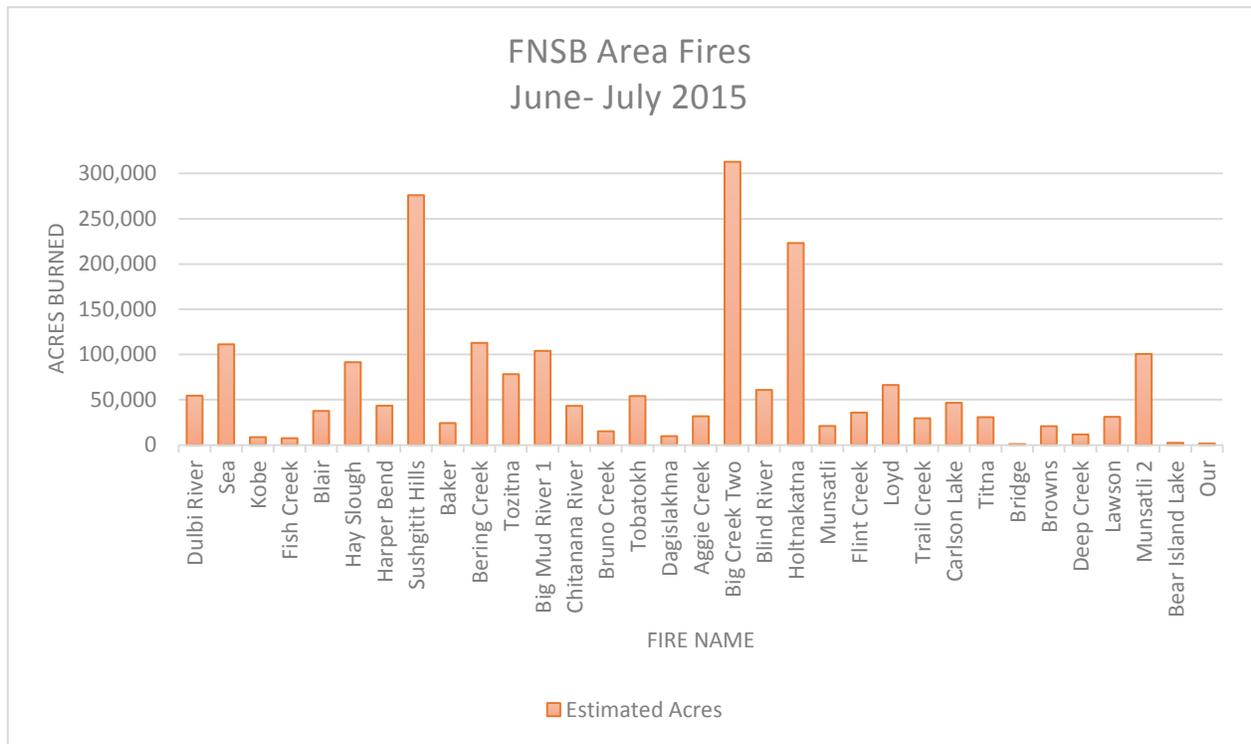


Figure 12. Estimated Acres burned for Interior Alaska fires

Daily Breakdown of the Event:

The daily changes in PM_{2.5} concentrations in Fairbanks for the period June 18 through July 31 and August 8 are described by terrain maps, satellite imagery, and modeling. The evidence presented for each day includes Moderate Resolution Imaging Spectroradiometer (MODIS) satellite imagery, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model backwards trajectory forecasts overlaid on terrain maps and MODIS imagery, and hourly PM_{2.5} concentrations. Supporting evidence from observational data, meteorology, and firefighting efforts are used to describe each day in the period.

Primary observational PM_{2.5} concentrations are from the Fairbanks NCORE, State Office Building and North Pole Federal Reference Method (FRM) monitors. Secondary data are from the co-located NCORE Federal Reference Method (FRM) monitors. The primary FRM data are PM_{2.5} 24-hour averaged filters run on a 1-in-3 day schedule. The secondary FRM data are PM_{2.5} 24-hour averaged filters run on a 1-in-6 day schedule. The continuous data are from a beta attenuation monitor (BAM) at the NCORE and North Pole Fire Station (NPF) sites. The BAM data are for completeness and to fill in for days when FRM data are not available.

All weather observation data were downloaded from the National Climate Data Center (NCDC) and were subject to their quality control process

(<http://www7.ncdc.noaa.gov/CDO/dataproduct>). The MODIS imagery was downloaded from

either <http://www.gina.alaska.edu/modis-gallery?year=2015> or <https://worldview.earthdata.nasa.gov/>. The HYSPLIT model information and model runs are available online from http://www.arl.noaa.gov/HYSPLIT_info.php.

PM_{2.5} data underwent quality assurance and control by FNSB and ADEC staff and meet the requirements as defined in the State Quality Assurance Plan. ADEC provides oversight of FNSB data collection, processing, and Quality Assurance and certifies all Fairbanks data entered into AQS, EPA's national ambient air monitoring database.

All days with PM_{2.5} concentrations above 12 µg/m³ from June 18 to August 8, 2015, are being submitted as one exceptional event. The cause of the increased PM_{2.5} concentrations throughout the entire period was wildland fire smoke. Daily PM_{2.5} concentrations varied with meteorological conditions and fire development or suppression. Wind direction (WD) and fire location were the most important components to impact PM_{2.5} concentrations in the Fairbanks North Star Borough.

June/July Event

The dry and hot conditions as discussed in the meteorology section above set the stage for rapid spread of fires throughout Alaska. On June 21, 2015, the Alaska Fire Service, Predictive Services Branch issued a "Fuels and Fire Behavior Advisory" for Interior Boreal Forest of Alaska. Parts of this advisory are quoted below (Complete advisory is available in Appendix E):

Fuels and Fire Behavior Advisory

Subject: Peak season conditions, pushed by above normal temperatures and low humidity, combine with fuels exposed to early season drying are producing very active to extreme fire behavior across a broad portion of Alaska.

Discussion: An extreme and extended hot and dry upper level ridge this June has again lifted fire danger indices to record levels. The extended period of RH in the teens this late in June is uncommon as is the broad area of Alaska with temperatures into the upper 80s. While these conditions will be moderating, the changes will not significantly reduce the extreme burning conditions observed.

Though the area of concern has greened up extremely warm and dry weather in both May and now again in June has produced fuel conditions of great concern for firefighters. Fine fuel moistures have repeatedly reached extreme levels, with Fine Fuel Moisture Code (FFMC) surpassing 92 and reaching 95 over widespread areas on numerous occasions. With that, both human activities and, now, lightning strikes ignite fires that are growing rapidly in some cases. On June 19th and 20th, at least 110 new starts were reported. Alaska this year has had low snow-pack and early snow-melt this spring along with low precipitation totals since then. Few occurrences of wetting rains have resulted in Duff Moisture Codes (DMC) reaching

very high to extreme levels across much of the area. Even without significant wind events, 8 of 39 new fires on June 19th exceeded 100 acres in the first burn period. Black Spruce is burning aggressively, with torching, spotting, and active crown fire. Surface fuels under White Spruce, mixed wood, and hardwoods are carrying fire. Even the greenest fuel beds should be considered available to burn.

Difference from normal conditions: Alaska has had well above normal temperatures through most of this spring with only a few brief breaks from the heat. Above normal temperatures over such a broad area of Alaska and over such a long time is rare. Also rare is the recent extended period of RH below 15% over much of the interior this late in the season and long after green-up. Fuels at lower elevations have been snow free since early May. With roughly 150 active fires across the state, ignition potential is now proven to be extremely high. DMC are reaching historic peaks for this time of year, reinforcing reports of extreme fire behavior.

The week this advisory was issued there were dramatic increase in fires due to lightning strikes to the west Fairbanks. During the two week period from June 18 to July 2, 2015 there were a total of 45,542 lightning strikes in the interior of Alaska (Figure 13). Table 10 is a list of 2015 interior Alaska fires, the majority of which make up the complex of fires identified in Figure 11 above and show the estimated fire growth over a two week period. The majority of the fires saw rapid growth after ignition, by July 6, 2015 an estimated total of 1,312,956 acres had burned in close proximity to FNSB.

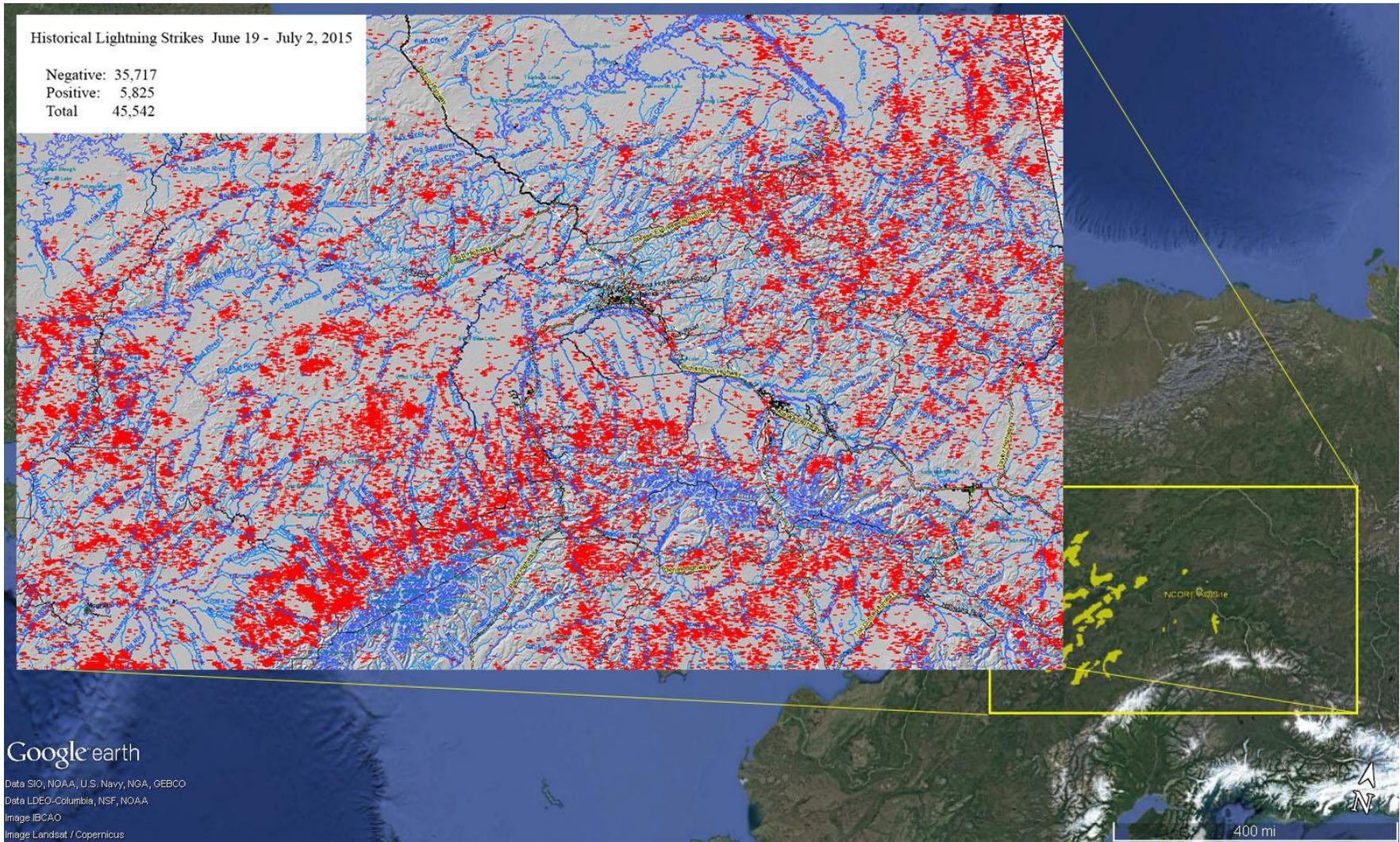


Figure 13. June 19 through July 2, lightning strikes for the interior of Alaska.

Table 10. Rapid growth of fires in the interior of Alaska

Fire Name	Discovery Date	Acreage		Growth (Acres)	Estimated Total Acres
	June	Initial	6-Jul-15		
Dulbi River	6/19	5	5,403	5,398	54,503
Sea	6/19	1	45,007	45,006	111,194
Kobe	6/20	1	8,642	8,641	8,642
Fish Creek	6/20	2	7,474	7,472	7,464
Blair	6/20	1	26,218	26,217	37,597
Hay Slough	6/21	1	40,394	40,393	91,444
Harper Bend	6/21	1	18,629	18,628	43,378
Sushgitit Hills	6/21	200	51,355	51,155	276,038
Baker	6/21	5	5,523	5,518	24,179
Bering Creek	6/21	1	61,053	61,052	112,807
Tozitna	6/21	1	72,962	72,961	78,213
Big Mud River 1	6/21	1,000	8,789	7,789	103,968
Chitanana River	6/21	800	37,972	37,172	43,200
Bruno Creek	6/21	1	13,157	13,156	15,132
Tobatokh	6/22	20	54,036	54,016	54,036
Dagislakhna	6/22	10	6,481	6,471	9,751
Aggie Creek	6/22	2	16,939	16,937	31,705
Big Creek Two	6/22	100	64,973	64,873	312,918
Blind River	6/22	800	46,542	45,742	60,807
Holtnakatna	6/22	1,000	101,299	100,299	223,154
Munsatli	6/22	1	19,477	19,476	20,943
Flint Creek	6/23	1	30,003	30,002	35,749
Loyd	6/23	1	4,363	4,362	66,268
Our Creek	6/23	1	27,560	27,559	30,736
Trail Creek	6/23	1	9,547	9,546	29,501
Carlson Lake	6/25	1	6,886	6,885	46,545
Titna	6/25	1	18,694	18,693	30,678
Bridge	6/25	1	1,475	1,474	967
Browns	6/25	1	17,133	17,132	20,730
Deep Creek	6/27	600	2,742	2,142	11,590
Lawson	6/29	10	12,810	12,800	31,090
	July	Initial	29-Jul-15		
Munsatli 2	7/4	1,500	91,442	89,942	100,524
Bear Island Lake	7/11	1	2,108	2,107	2,363
	Total Acres	6,072	979,302	931,016	

Daily Breakdown of the Event:

The following section describes the daily smoke impact to the FNSB sampling sites. The daily changes in PM_{2.5} concentrations in Fairbanks and North Pole for the period June 18 through July 31 and August 8 are described by terrain maps, satellite imagery, and modeling. The evidence presented for each day includes Moderate Resolution Imaging Spectroradiometer (MODIS) satellite imagery, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model backwards trajectory forecasts overlaid on terrain maps and MODIS imagery, and hourly PM_{2.5} concentrations. Supporting evidence from observational data, meteorology, and firefighting efforts are used to describe each day in the period.

Primary observational PM_{2.5} concentrations are from the Fairbanks NCORE, State Office Building and North Pole Federal Reference Method (FRM) monitors. Secondary data are from the co-located NCORE Federal Reference Method (FRM) monitors. The primary FRM data are PM_{2.5} 24-hour averaged filters run on a 1-in-3 day schedule. The secondary FRM data are PM_{2.5} 24-hour averaged filters run on a 1-in-6 day schedule. The continuous data are from a beta attenuation monitor (BAM) at the NCore and North Pole Fire Station (NPF) sites. The BAM data are included for completeness and to fill in for days when FRM data are not available.

PM_{2.5} data underwent quality assurance and control by FNSB and ADEC staff and meet the requirements as defined in the State Quality Assurance Plan. ADEC provided oversight of FNSB data collection, processing, and Quality Assurance and certified all Fairbanks data entered into AQS, EPA's national ambient air monitoring database.

The PM_{2.5} concentration graphs consist of 24-hour run concentrations for 2015 fire season days from the State Office Building (SOB) FRM, NCore FRM, and North Pole Fire (NPF) FRM sites, which operated on a 1-in-3 and 1-in-6 schedule. Also included are the NCore and NPF BAM PM_{2.5} hourly average concentrations of the 29 days identified below. The data capture for individual hours was 97.9% (1364 of 1392 hours). The raw data was compiled from the EPA Air Quality System (AQS). The 24-hour NAAQS and Annual NAAQS are identified by black dashed lines in the graph. Also added to each graph is the low-year 95th percentile concentration for the corresponding month. This monthly 95th percentile value was calculated by averaging the 24 hour PM_{2.5} concentration by month for low fire years and excluding all data flagged by ADEC as caused by an exceptional event during those low fire years so that the remaining data would exclude most fire/smoke impacts. The monthly low-years 95th percentile concentration is identified on each graph by a solid green line.

All weather observation data were downloaded from the National Climate Data Center (NCDC) and were subject to their quality control process (<http://www7.ncdc.noaa.gov/CDO/dataproduct>). The MODIS imagery was downloaded from either <http://www.gina.alaska.edu/modis-gallery?year=2015> or <https://worldview.earthdata.nasa.gov/>. The HYSPLIT model information and model runs are available online from http://www.arl.noaa.gov/HYSPLIT_info.php.

The HYSPLIT Model outputs were created via the Air Resources Laboratory HYSPLIT-Web (Internet based) program utilizing archived GDAS (0.5 degree, global, 09/2007-present) for back

trajectory calculations at 30m, 100m, and 500m elevations. The outputs were generated for 0400L, 1000L, 1600L, 2200L (12Z, 18Z, next day 00Z, next day 06Z), which helped identify the wind pattern/air parcel movement throughout the day. Overlaying multiple transport levels onto Google Earth imagery of the western fire complex makes it easier to identify specific wind flow patterns that were the main transport mechanism for smoke into FNSB.

Accompanying each Google Earth map is a NASA Worldview image compiled from polar orbiting satellites, the daily image of Alaska is captured in the afternoon hours. By having the HYSPLIT trajectory levels next to or overlaid on the satellite imagery, this provides a representation of the smoke plumes responsible for the elevated $PM_{2.5}$ concentrations at FNSB. A brief description of the imagery follows each picture.

Lastly, 24-hour raw observation data from Fairbanks International Airport was obtained via MesoWest, University of Utah Department of Atmospheric Sciences. Tables of hourly conditions on individual days were created to show specific time of day that smoke impacted Fairbanks. Using the visibility observations from the airport and the $PM_{2.5}$ concentration reading at a specific time can help determine AQI category for the surrounding area. The wind data, in conjunction with the HYSPLIT back trajectories, provide the information needed to track air parcel/smoke movement.

June 18, 2015

AICC Report Fire Information: There were 6 new fires reported, for a total of 57 fires burning statewide. For the 2015 fire season 89,820 acres have been burned, and that is a 24-hr increase of 10,076 acres from the previous day.

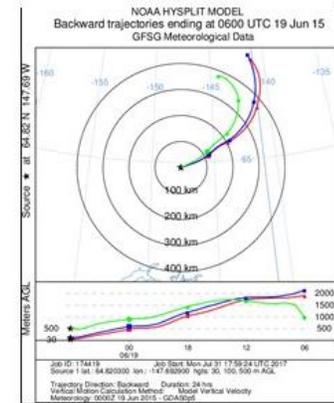
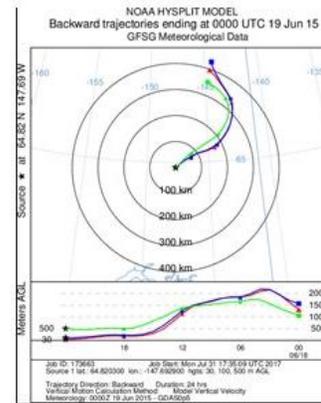
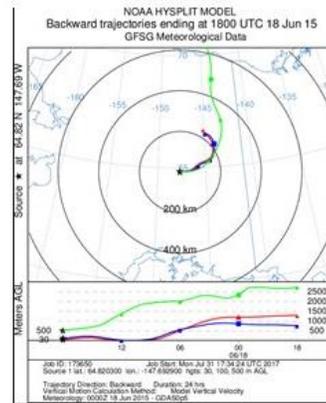
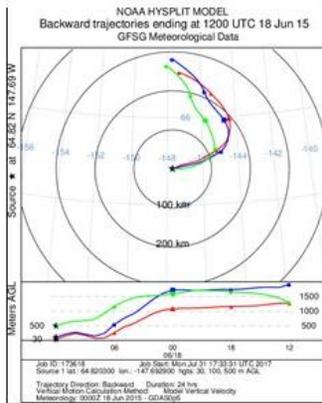
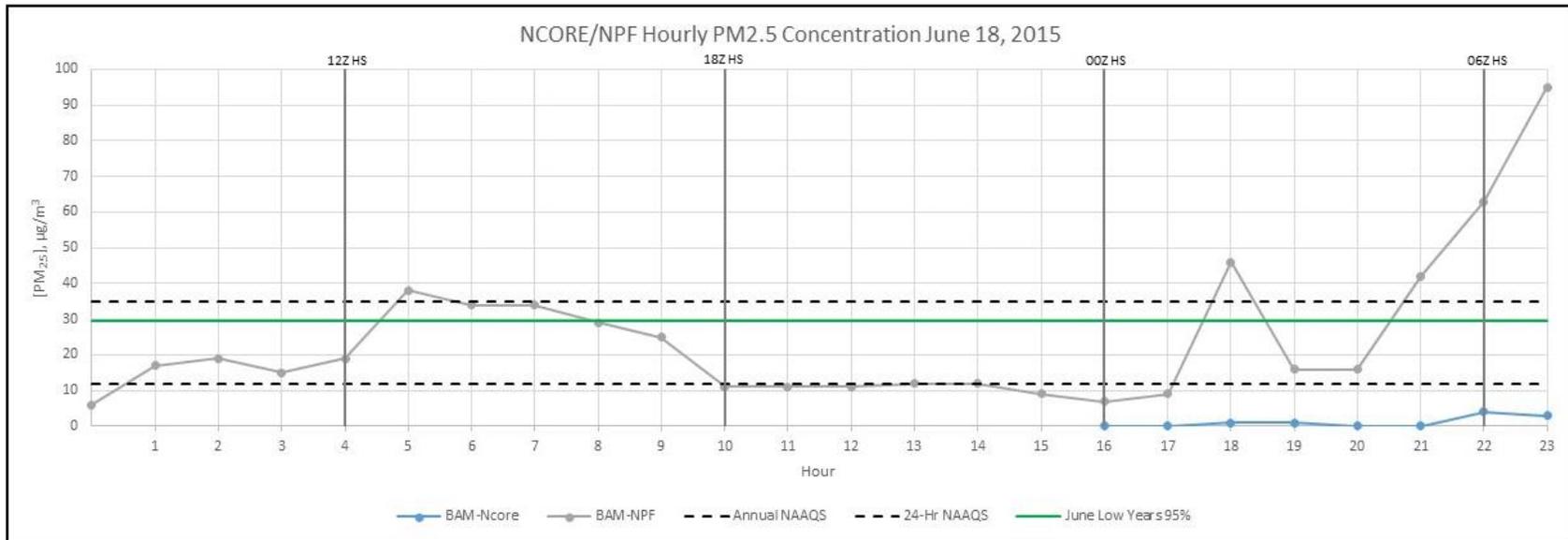


Figure 14. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 18, 2015

PM_{2.5} data: Figure 14. Depicts the hourly PM_{2.5} concentration increase gradually beginning at 0400L. Concentrations dropped during the late morning and afternoon hours before rapidly increasing in the early evening. The maximum hourly concentrations were above 90 μg/m³. This was not a 1-in-6 or 1-in-3 run day so FRM data is not available for any of the sites this date. The NCORE PM_{2.5}BAM was not operational for most of the day. The NPF BAM PM_{2.5} 24 hour average concentration was 24.8 μg/m³.

HYSPLIT trajectory: The HYSPLIT model indicates a flow at the 30M/100M/500M levels from the northeast throughout the day. The 18Z HYSPLIT run has been overlaid on the Google Earth image, Figure 15. The two fires to the east experienced moderate growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

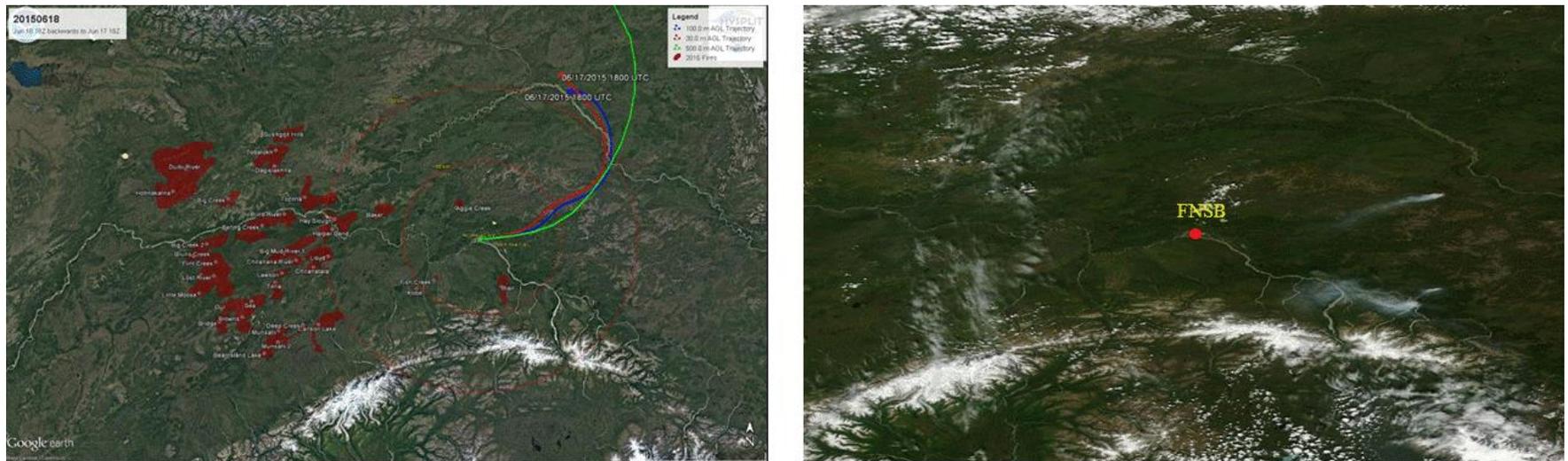


Figure 15. Google Earth with 2015 Fire Perimeters and 18/18Z Hysplit 30m/100m/500m back trajectory. June 18, 2015 MODIS satillite imagery.

MODIS image: The trajectory overlay onto the satellite imagery for June 18, 2015 shows the 30m (what color?????) trajectory passing directly through the small fire to the east of Fairbanks.

Table 11. Hourly observation for Fairbanks International Airport, June 18, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/18/2015 00:53 AKDT	5	**	**	**	10	64	39
PAFA	06/18/2015 01:53 AKDT	7	40	**	**	10	61	41
PAFA	06/18/2015 02:53 AKDT	0	0	**	**	10	58	41
PAFA	06/18/2015 03:53 AKDT	3	360	**	**	10	54	42
PAFA	06/18/2015 04:53 AKDT	5	80	**	**	7	54	41
PAFA	06/18/2015 05:53 AKDT	**	**	**	7 (Smoke)	6	59	41
PAFA	06/18/2015 06:53 AKDT	**	**	**	**	9	59	41
PAFA	06/18/2015 07:53 AKDT	0	0	**	**	10	63	44
PAFA	06/18/2015 08:53 AKDT	0	0	**	**	10	68	41
PAFA	06/18/2015 09:53 AKDT	7	100	**	**	10	70	37
PAFA	06/18/2015 10:53 AKDT	8	60	**	**	10	74	39
PAFA	06/18/2015 11:53 AKDT	6	**	**	**	10	73	37
PAFA	06/18/2015 12:53 AKDT	7	150	**	**	10	75	39
PAFA	06/18/2015 13:53 AKDT	3	230	**	**	10	76	38
PAFA	06/18/2015 14:53 AKDT	8	190	**	**	10	79	39
PAFA	06/18/2015 15:53 AKDT	0	0	**	**	10	80	39
PAFA	06/18/2015 16:53 AKDT	10	70	**	**	10	81	43
PAFA	06/18/2015 17:53 AKDT	0	0	**	**	10	82	43
PAFA	06/18/2015 18:53 AKDT	5	40	**	**	10	81	41
PAFA	06/18/2015 19:53 AKDT	6	70	**	**	10	81	37
PAFA	06/18/2015 20:53 AKDT	9	80	**	**	10	79	40
PAFA	06/18/2015 21:53 AKDT	7	90	**	**	10	77	41
PAFA	06/18/2015 22:53 AKDT	5	100	**	**	10	73	43
PAFA	06/18/2015 23:53 AKDT	0	0	**	**	10	69	46

Surface observations: Table 8 show the morning winds were light and variable with a slight visibility drop due to smoke (reflected in Figure 14, 0500-0900L). After the late morning inversion break, then the predominant wind direction was out of the southeast until the easterly shift in late afternoon. The evening observations do not report any smoke impacting Fairbanks at this time, the main concentration of smoke was still slightly to the SE, NPF BAM_{2.5} concentrations started to climb after 1700L.

June 19, 2015

AICC Report Fire Information: There was 1 new fire reported, for a total of 50 fires burning statewide. For the 2015 fire season 109,445 acres have been burned, and that is a 24-hr increase of 25,284 acres from the previous day.

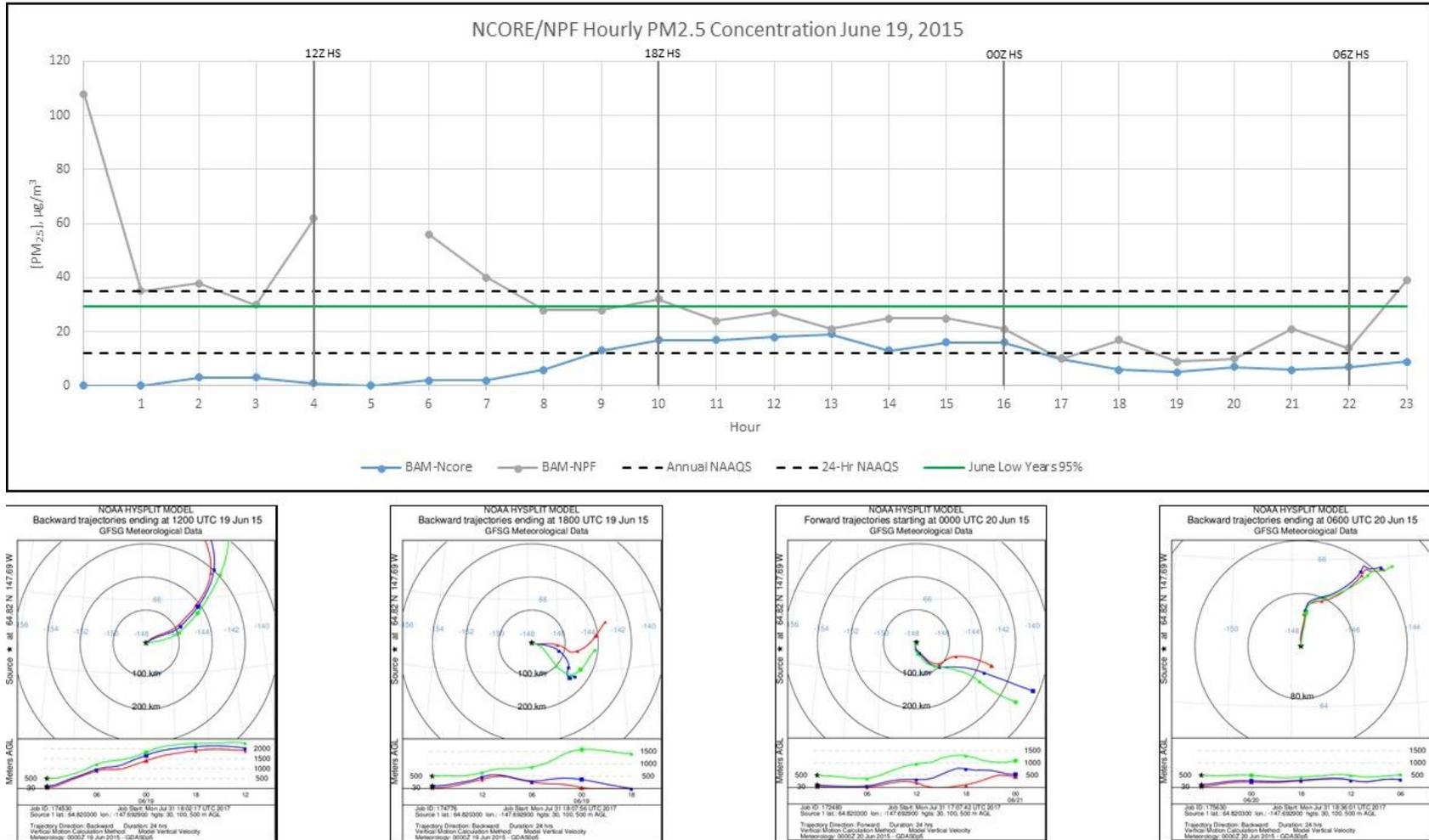


Figure 16. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 19, 2015

PM_{2.5} data: Note: Data procedures are described in the Introduction section above. Figure 16 depicts the hourly PM_{2.5}

concentration at elevated levels in early morning, they gradually dropped throughout the day before climbing late in the day. The maximum concentrations for the day were above $100 \mu\text{g}/\text{m}^3$ at the 0000L. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24 hour FRM, secondary NCORE 24 hour FRM, and SOB 24 hour FRM are not available for this date. The NCORE continuous BAM $\text{PM}_{2.5}$ 24 hour average concentration was $31.3 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: From Figure 16 the 18Z (1000L) and 00Z (1600L) runs indicate a flow from the NW. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 17. The two fires to the east have experienced moderate growth during this period and elevated $\text{PM}_{2.5}$ concentrations are a result of the smoke being advected into FNSB.

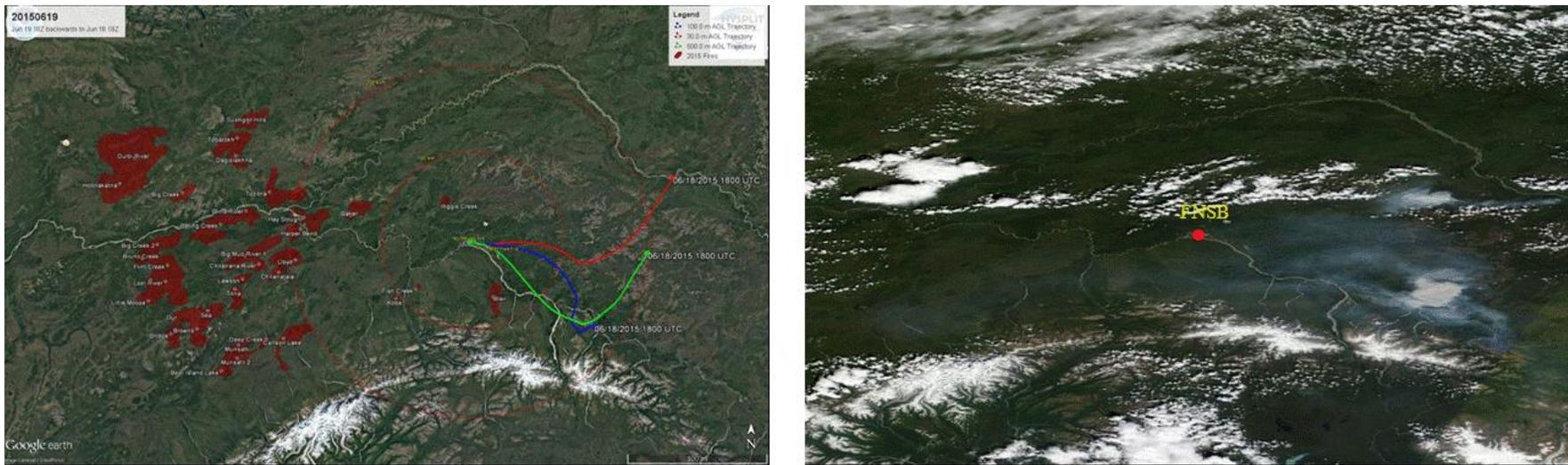


Figure 17. Google Earth with 2015 Fire Perimeters and 19/18Z Hysplit 30m/100m/500m back trajectory. June 19, 2015 MODIS satellite imagery.

MODIS image: Imagery for June 19, 2015 shows the 30m/100m/500m trajectory passing directly through the eastern fires smoke plumes.

Table 12. Hourly observation for Fairbanks International Airport, June 19, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/19/2015 00:53 AKDT	0	0	**	**	10	63	46
PAFA	06/19/2015 01:53 AKDT	0	0	**	**	10	61	43
PAFA	06/19/2015 02:53 AKDT	5	30	**	**	10	59	41
PAFA	06/19/2015 03:53 AKDT	0	0	**	**	10	57	43
PAFA	06/19/2015 04:53 AKDT	6	60	**	**	10	57	41
PAFA	06/19/2015 05:53 AKDT	5	50	**	**	10	57	43
PAFA	06/19/2015 06:53 AKDT	0	0	**	**	10	63	44
PAFA	06/19/2015 07:53 AKDT	0	0	**	**	10	65	43
PAFA	06/19/2015 08:53 AKDT	3	120	**	**	10	68	43
PAFA	06/19/2015 09:53 AKDT	6	110	**	**	10	71	42
PAFA	06/19/2015 10:53 AKDT	3	80	**	**	10	73	43
PAFA	06/19/2015 11:53 AKDT	3	**	**	**	10	75	39
PAFA	06/19/2015 12:53 AKDT	0	0	**	**	10	78	39
PAFA	06/19/2015 13:53 AKDT	6	**	**	**	10	81	39
PAFA	06/19/2015 14:53 AKDT	5	130	**	**	10	81	39
PAFA	06/19/2015 15:53 AKDT		**	**	**	10	82	38
PAFA	06/19/2015 16:53 AKDT	5	**	**	**	10	82	39
PAFA	06/19/2015 17:53 AKDT	0	0	**	**	10	84	38
PAFA	06/19/2015 18:53 AKDT	9	340	**	**	10	79	45
PAFA	06/19/2015 19:53 AKDT	6	310	**	**	10	78	42
PAFA	06/19/2015 20:53 AKDT	6	330	**	**	10	81	43
PAFA	06/19/2015 21:53 AKDT	8	340	**	**	10	77	45
PAFA	06/19/2015 22:53 AKDT	3	300	**	**	10	75	47
PAFA	06/19/2015 23:53 AKDT	0	0	**	**	10	72	48

Surface observations: Table 9 show the morning winds were light with an easterly component. After the late morning inversion break, then the predominant wind direction was out of the southeast until the northerly shift in late afternoon early evening. Fairbanks International Airport did not record any restriction to visibility for the day.

June 20, 2015

AICC Report Fire Information: There were 39 new fires reported for a total of 87 fires burning statewide. For the 2015 fire season 130,314 acres have been burned, and that is a 24-hr increase of 15,209 acres from the previous day.

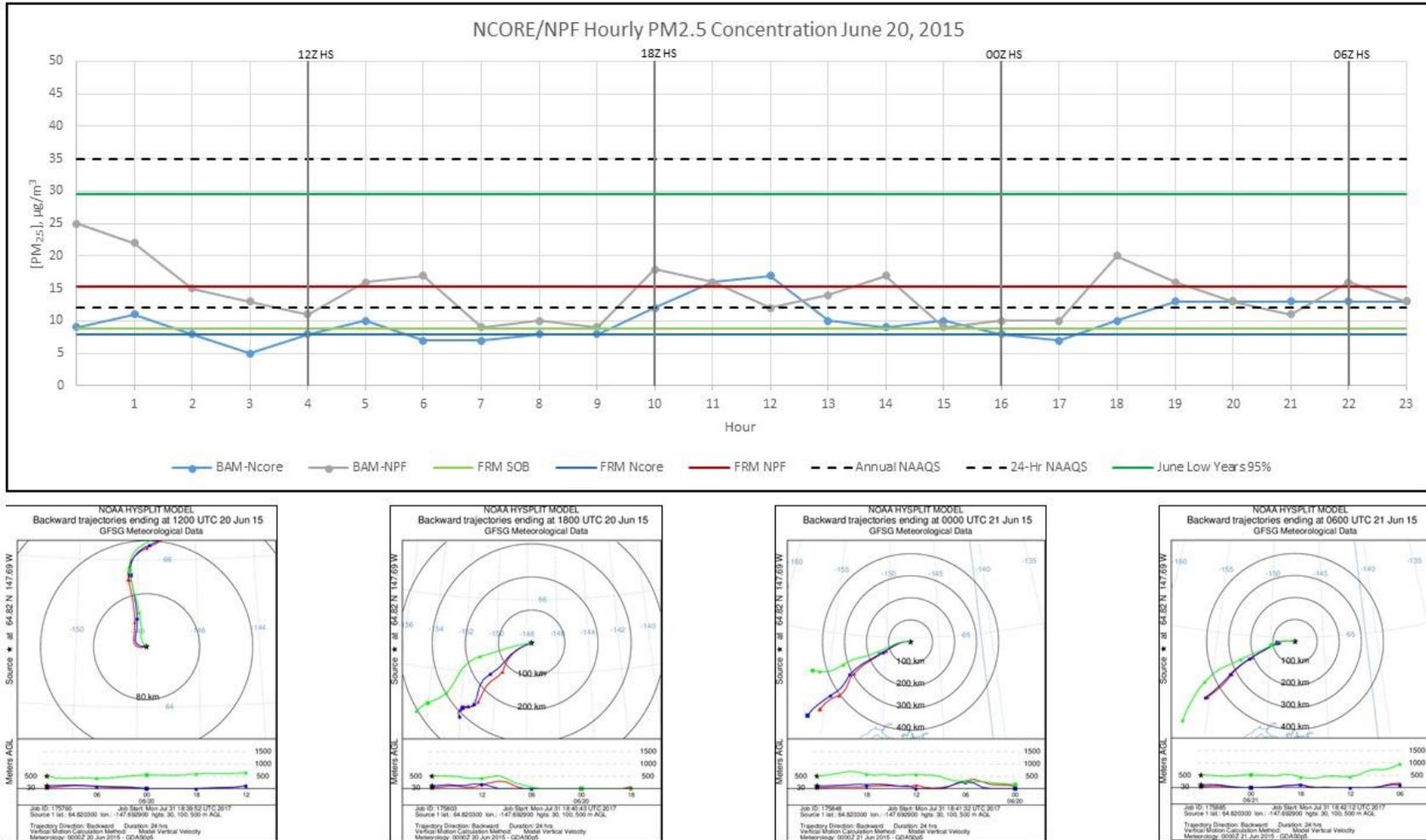


Figure 18. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr Hyplit runs for June 20, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 18 depicts slightly elevated hourly

PM_{2.5} concentration throughout the day June 20, 2015. The SOB 24-hour FRM PM_{2.5} concentration was 8.8 μg/m³, NCORE continuous BAM PM_{2.5} 24-hour average concentration was 10.2 μg/m³, NCORE 24-hour FRM PM_{2.5} concentration was 8.0 μg/m³, NPF continuous BAM PM_{2.5} 24 hour average concentration was 14.3 μg/m³, and NPF 24-hour FRM PM_{2.5} concentration was 15.3 μg/m³.

HYSPLIT trajectory: The 18Z (1000L) run indicates a shift in flow from the north to the southwest interior. This flow will continue for the next few days and as the fire complex to the southwest intensifies, more smoke will be advected into the FNSB area. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 19.

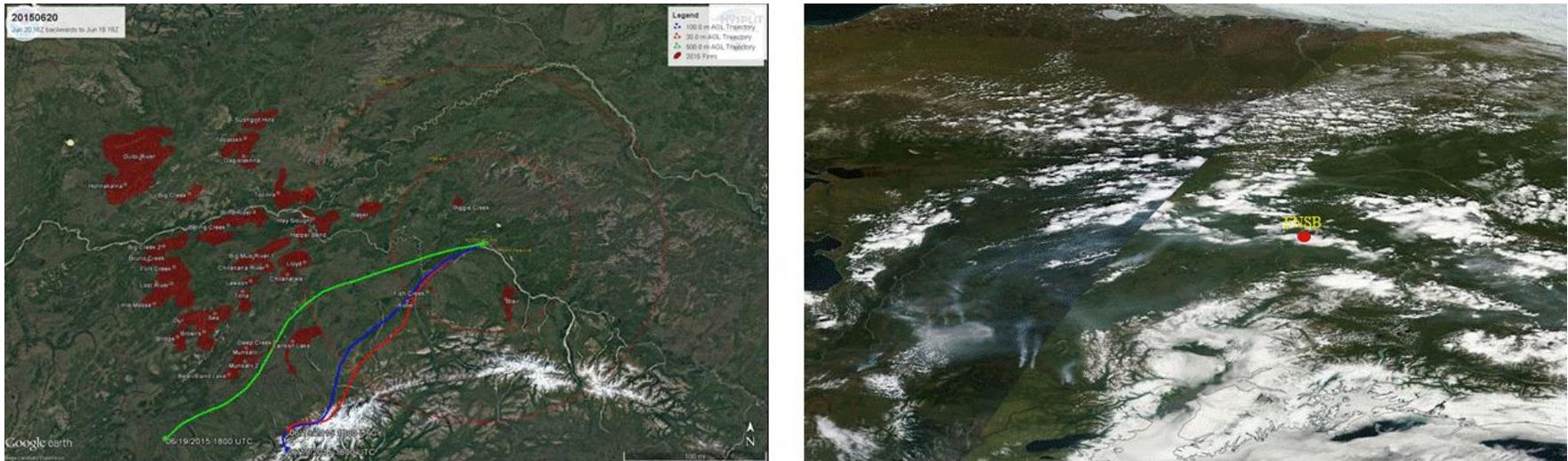


Figure 19. Google Earth with 2015 Fire Perimeters and 20/18Z Hysplit 30m/100m/500m back trajectory. June 20, 2015 MODIS satellite imagery.

MODIS image: Imagery for June 20, 2015 shows the start of the fire complex to the west southwest of FNSB, 30m trajectory passes directly through the western complex of fires into Fairbanks. Smoke is visible on the imagery throughout the interior of Alaska.

Table 13. Hourly observation for Fairbanks International Airport, June 20, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	Conditio n	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/20/2015 00:53 AKDT	6	70	**	**	10	66	46
PAFA	06/20/2015 01:53 AKDT	0	0	**	**	10	63	47
PAFA	06/20/2015 02:53 AKDT	7	190	**	**	10	63	48
PAFA	06/20/2015 03:53 AKDT	0	0	**	**	10	58	49
PAFA	06/20/2015 04:53 AKDT	3	170	**	**	10	65	47
PAFA	06/20/2015 05:53 AKDT	3	220	**	**	10	65	47
PAFA	06/20/2015 06:53 AKDT	0	0	**	**	10	64	48
PAFA	06/20/2015 07:53 AKDT	3	60	**	**	10	63	52
PAFA	06/20/2015 08:53 AKDT	3	130	**	13 (Rain)	9	61	52
PAFA	06/20/2015 09:53 AKDT	5	30	**	**	7	61	54
PAFA	06/20/2015 10:53 AKDT	0	0	**	13 (Rain)	8	62	57
PAFA	06/20/2015 11:53 AKDT	0	0	**	**	9	66	53
PAFA	06/20/2015 12:53 AKDT	0	0	**	**	10	68	55
PAFA	06/20/2015 13:53 AKDT	0	0	**	**	10	71	55
PAFA	06/20/2015 14:53 AKDT	7	**	**	**	10	77	50
PAFA	06/20/2015 15:53 AKDT	7	**	**	**	10	82	48
PAFA	06/20/2015 16:53 AKDT	8	280	**	**	10	82	46
PAFA	06/20/2015 17:53 AKDT	6	**	**	**	10	84	45
PAFA	06/20/2015 18:53 AKDT	5	320	**	**	10	83	45
PAFA	06/20/2015 19:53 AKDT	10	310	**	**	10	82	45
PAFA	06/20/2015 20:53 AKDT	10	160	**	**	10	75	49
PAFA	06/20/2015 21:53 AKDT	9	180	**	**	10	73	50
PAFA	06/20/2015 22:53 AKDT	7	170	**	**	10	70	52
PAFA	06/20/2015 23:53 AKDT	5	150	**	**	10	66	51

Surface observations: Table 10 show the morning winds were light and variable until early afternoon. Winds shifted to a westerly component late afternoon and transitioned to a southerly flow. Fairbanks International Airport did not record any restriction to visibility for the day.

June 21, 2015

AICC Report Fire Information: There were 67 new fires reported for a total of 149 fires burning statewide. For the 2015 fire season 178,035 acres have been burned, and that is a 24-hr increase of 47,721 acres from the previous day.

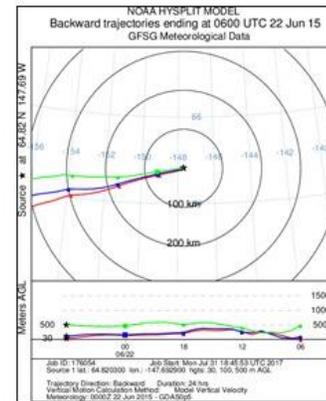
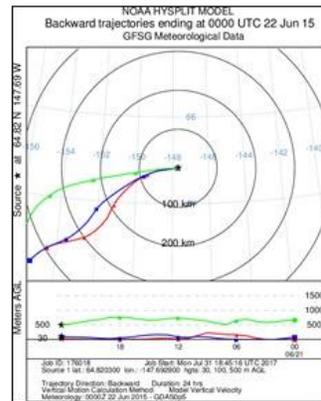
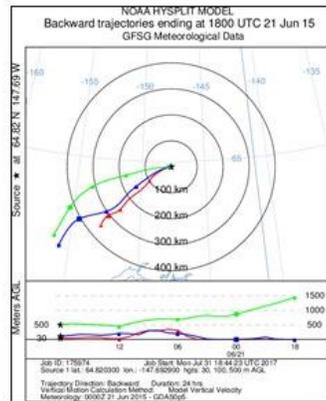
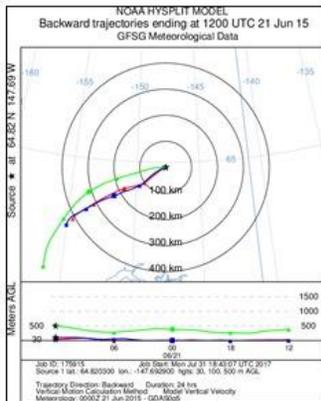
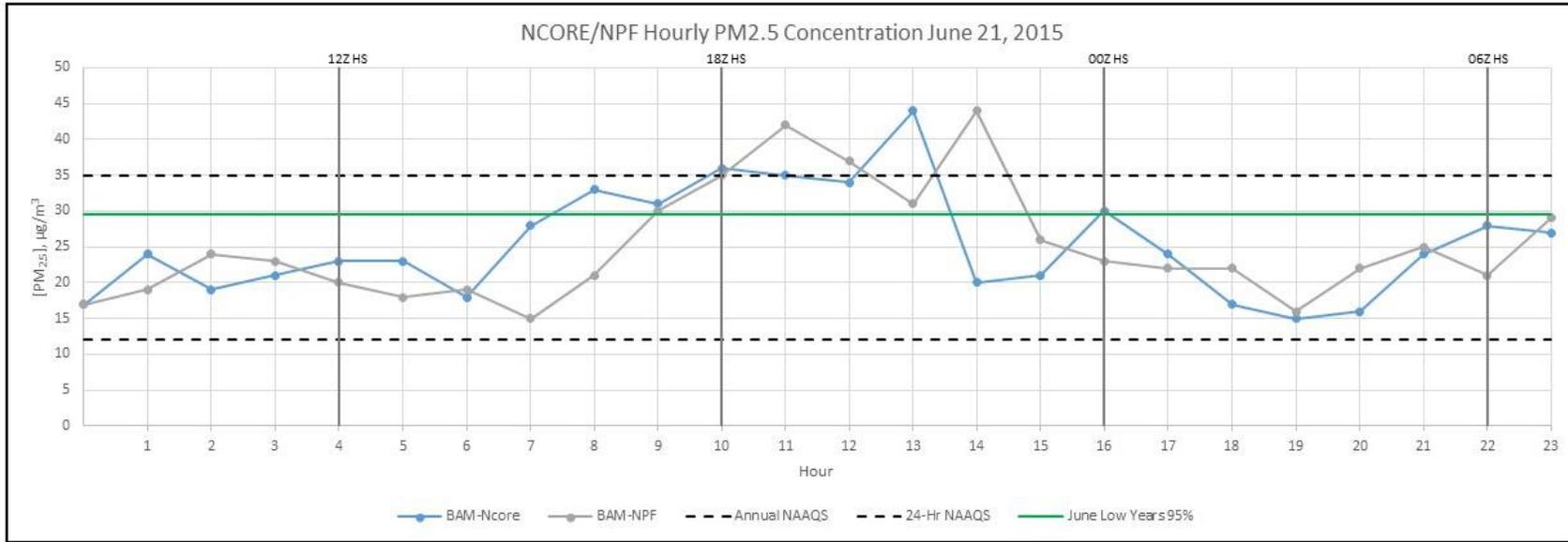


Figure 20. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 21, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 16 depicts the hourly PM_{2.5}

concentration at elevated levels in early morning with a gradual increase in concentrations throughout the early afternoon. The highest concentrations for the day were above $40 \mu\text{g}/\text{m}^3$ at the 1300L. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24 hour FRM, secondary NCORE 24 hour FRM, and SOB 24 hour FRM are not available for this date. The NCORE continuous BAM $\text{PM}_{2.5}$ 24 hour average concentration was $25.3 \mu\text{g}/\text{m}^3$ and the NPF continuous BAM $\text{PM}_{2.5}$ 24 hour average concentration was $25.0 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates a flow from the interior fires traveling NNE then transitioning to an eastward movement to Fairbanks. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 21. All fires experienced moderate growth during this period.

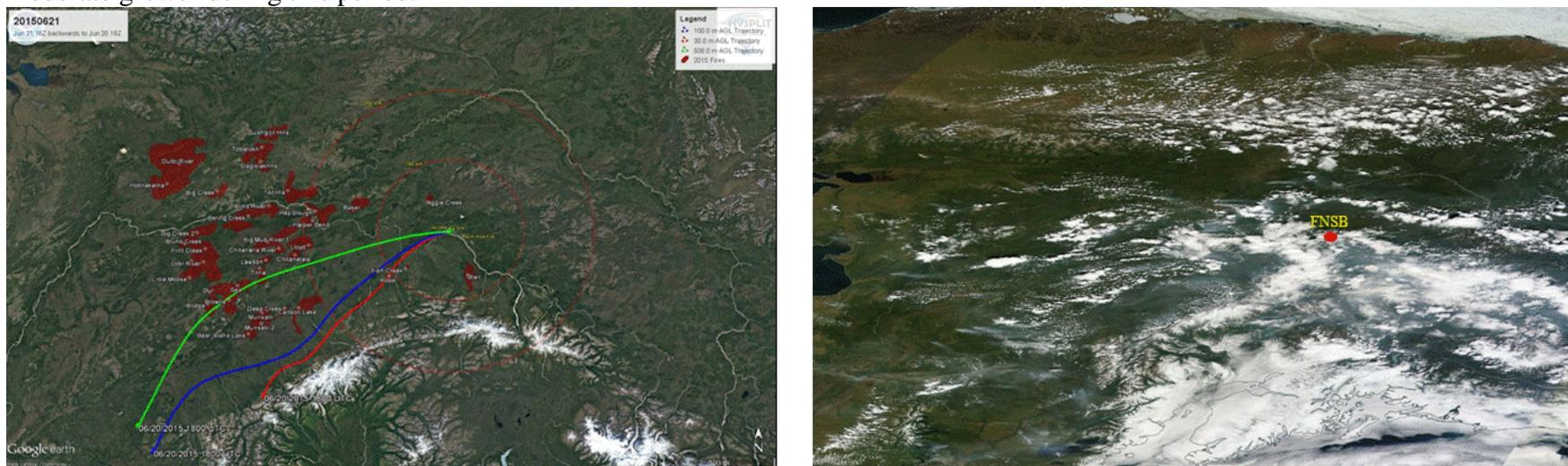


Figure 21. Google Earth with 2015 Fire Perimeters and 21/18Z Hysplit 30m/100m/500m back trajectory. June 21, 2015 MODIS satillite imagery.

MODIS image: Imagery for June 21, 2015 shows the 30m trajectory passing directly through smoke from the western complex of fires. Smoke is visible on the imagery throughout the interior of Alaska.

Table 14. Hourly observation for Fairbanks International Airport, June 21, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/21/2015 00:53 AKDT	7	190			10	64	52
PAFA	06/21/2015 01:53 AKDT	7	200			10	64	50
PAFA	06/21/2015 02:53 AKDT	5	210			10	63	48
PAFA	06/21/2015 03:53 AKDT	3				10	61	48
PAFA	06/21/2015 04:53 AKDT	0	0			10	56	50
PAFA	06/21/2015 05:53 AKDT	0	0			10	59	50
PAFA	06/21/2015 06:53 AKDT	3	150			10	59	50
PAFA	06/21/2015 07:53 AKDT	0	0			8	59	52
PAFA	06/21/2015 08:53 AKDT	3	100			8	60	50
PAFA	06/21/2015 09:53 AKDT	0	0			8	63	52
PAFA	06/21/2015 10:53 AKDT	0	0			7	64	54
PAFA	06/21/2015 11:53 AKDT	5	140			7	68	54
PAFA	06/21/2015 12:53 AKDT	7	250		7 (Smoke)	6	75	50
PAFA	06/21/2015 13:53 AKDT	13	240	18	7 (Smoke)	6	73	49
PAFA	06/21/2015 14:53 AKDT	12	250	16	7 (Smoke)	6	73	52
PAFA	06/21/2015 15:53 AKDT	10	260			8	79	52
PAFA	06/21/2015 16:53 AKDT	7	230			8	79	52
PAFA	06/21/2015 17:53 AKDT	9	250			8	78	51
PAFA	06/21/2015 18:53 AKDT	8	240			8	78	49
PAFA	06/21/2015 19:53 AKDT	6	240			8	78	49
PAFA	06/21/2015 20:53 AKDT	0	0			8	77	48
PAFA	06/21/2015 21:53 AKDT	3	200			8	75	52
PAFA	06/21/2015 22:53 AKDT	3	210			8	73	52
PAFA	06/21/2015 23:53 AKDT	0	0			8	66	56

Surface observations: Table 11 show the morning winds were light and variable until early afternoon. Winds shifted to a westerly component early afternoon which allowed the smoke from the west to advect into Fairbanks. The highest PM_{2.5} concentrations occurred between 1200-1400L and are reflected by the lower visibility in the surface observations.

June 22, 2015

AICC Report Fire Information: There were 49 new fires reported for a total of 186 fires burning statewide. For the 2015 fire season 229,441 acres have been burned, and that is a 24-hr increase of 51,406 acres from the previous day.

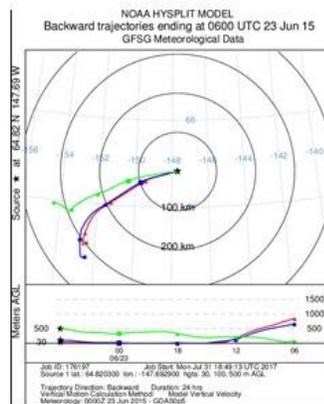
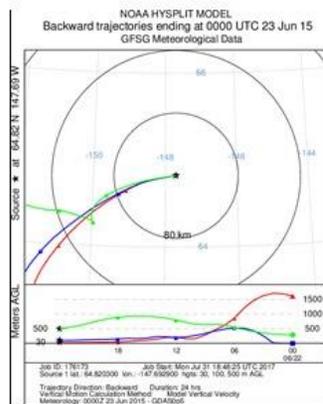
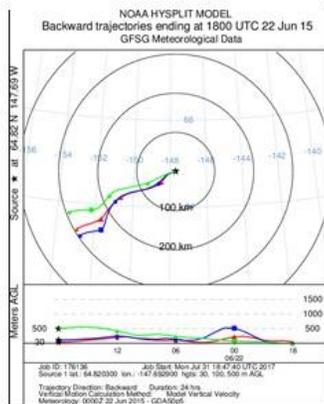
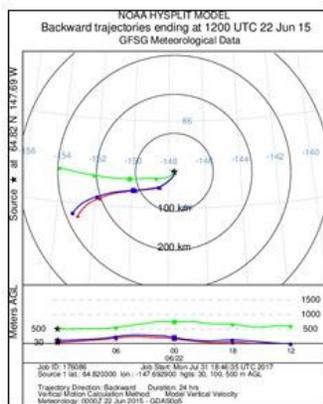
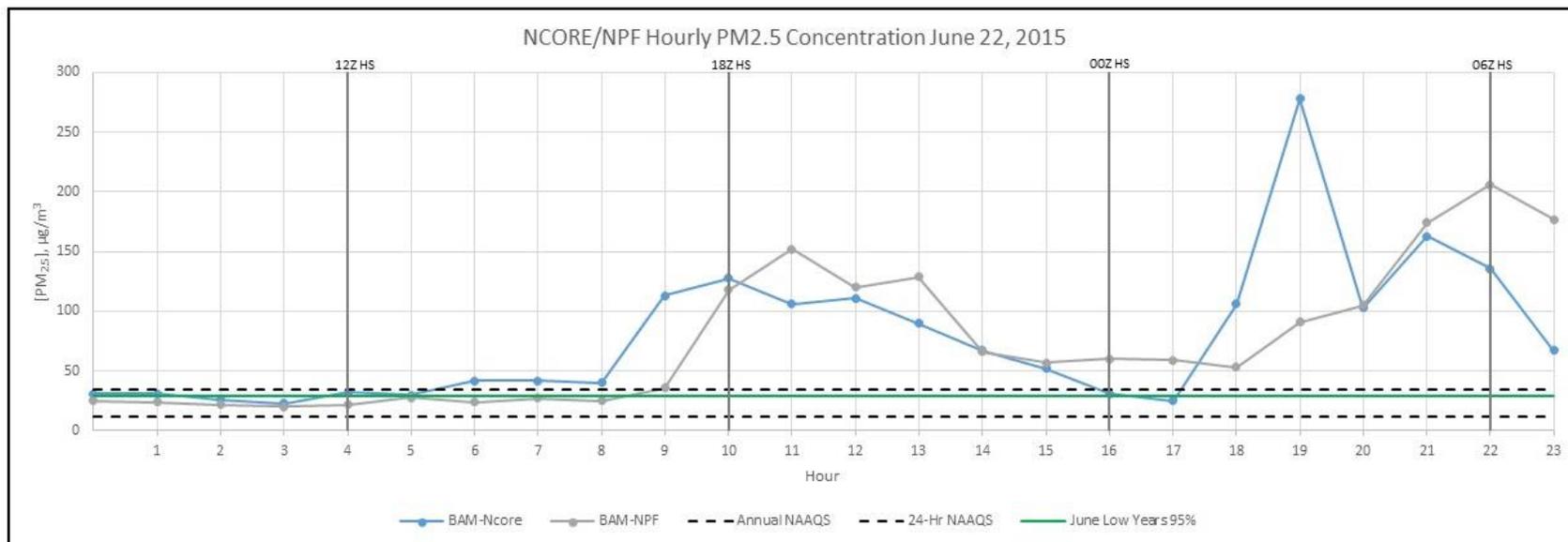


Figure 22. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 22, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 22 depicts the hourly PM_{2.5}

concentration at elevated levels in early morning with a significant increase in concentrations throughout the day. The highest concentrations for the day were above $250 \mu\text{g}/\text{m}^3$ at the 1900L. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24 hour FRM, secondary NCORE 24 hour FRM, and SOB 24 hour FRM are not available for this date. The NCORE continuous BAM $\text{PM}_{2.5}$ 24 hour average concentration was $78.0 \mu\text{g}/\text{m}^3$ and the NPF continuous BAM $\text{PM}_{2.5}$ 24 hour average concentration was $75.1 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates the flow at all levels, 30m/100m/500m, from the western fire complex traveling NE then into Fairbanks. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 23. All fires experienced explosive growth during this period.

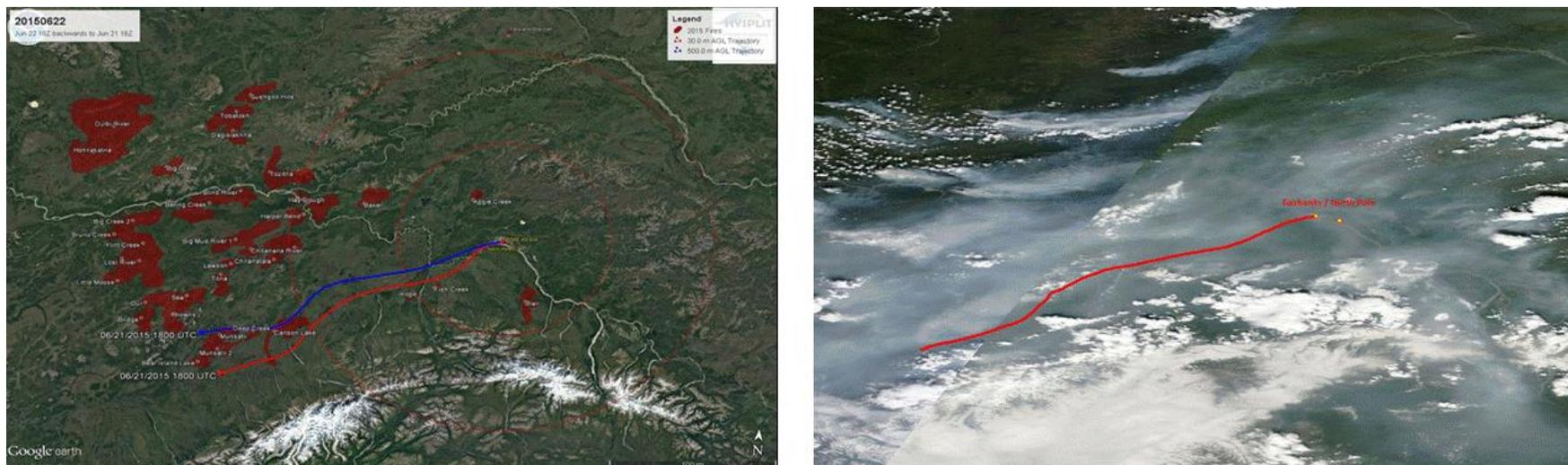


Figure 23. Google Earth with 2015 Fire Perimeters and 22/18Z Hysplit 30m/100m/500m back trajectory. June 22, 2015 MODIS satillite imagery overlaid with 30m trajectory, 22/18Z Hysplit.

MODIS image: Imagery for June 22, 2015 shows the 30m trajectory passing directly through the western fire complex's smoke field. Dense smoke is visible on the imagery throughout the interior of Alaska.

Table 15. Hourly observation for Fairbanks International Airport, June 22, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/22/2015 00:53 AKDT	0	0	**	**	8	61	54
PAFA	06/22/2015 01:53 AKDT	3	350	**	**	8	61	53
PAFA	06/22/2015 02:53 AKDT	5	30	**	**	8	57	52
PAFA	06/22/2015 03:53 AKDT	0	0	**	**	8	56	50
PAFA	06/22/2015 04:53 AKDT	0	0	**	**	8	57	51
PAFA	06/22/2015 05:53 AKDT	0	0	**	**	8	58	51
PAFA	06/22/2015 06:53 AKDT	3	10	**	**	7	59	52
PAFA	06/22/2015 07:53 AKDT	3	30	**	**	7	63	54
PAFA	06/22/2015 08:53 AKDT	0	0	**	**	7	64	52
PAFA	06/22/2015 09:53 AKDT	0	0	**	7 (Smoke)	6	65	52
PAFA	06/22/2015 10:53 AKDT	3	**	**	7 (Smoke)	3	69	53
PAFA	06/22/2015 11:53 AKDT	0	0	**	7 (Smoke)	3	72	53
PAFA	06/22/2015 12:53 AKDT	0	0	**	7 (Smoke)	3	74	53
PAFA	06/22/2015 13:53 AKDT	3	190	**	7 (Smoke)	3	77	54
PAFA	06/22/2015 14:53 AKDT	5	240	**	7 (Smoke)	3	80	52
PAFA	06/22/2015 15:53 AKDT	6	240	**	7 (Smoke)	4	81	48
PAFA	06/22/2015 16:53 AKDT	9	260	**	7 (Smoke)	4	81	46
PAFA	06/22/2015 17:53 AKDT	8	260	**	7 (Smoke)	6	80	48
PAFA	06/22/2015 18:53 AKDT	8	250	**	7 (Smoke)	5	81	50
PAFA	06/22/2015 19:53 AKDT	9	240	**	7 (Smoke)	1	77	50
PAFA	06/22/2015 20:53 AKDT	8	240	**	7 (Smoke)	3	76	49
PAFA	06/22/2015 21:53 AKDT	6	230	**	7 (Smoke)	2	73	48
PAFA	06/22/2015 22:53 AKDT	7	210	**	7 (Smoke)	2	72	48
PAFA	06/22/2015 23:53 AKDT	7	200	**	7 (Smoke)	2	66	48

Surface observations: Table 12 show the morning winds were light and variable until early afternoon. Winds shifted to a westerly component early afternoon which allowed the smoke from the west to easily advect into Fairbanks. The highest PM_{2.5} concentrations occurred between 0800-2300L and are reflected by the lower visibility in the Fairbanks surface observations for June 22, 2015.

June 23, 2015

AICC Report Fire Information: There were 61 new fires reported, for a total of 242 fires burning statewide. For the 2015 fire season 238,124 acres have been burned, and that is a 24-hr increase of 98,683 acres from the previous day.

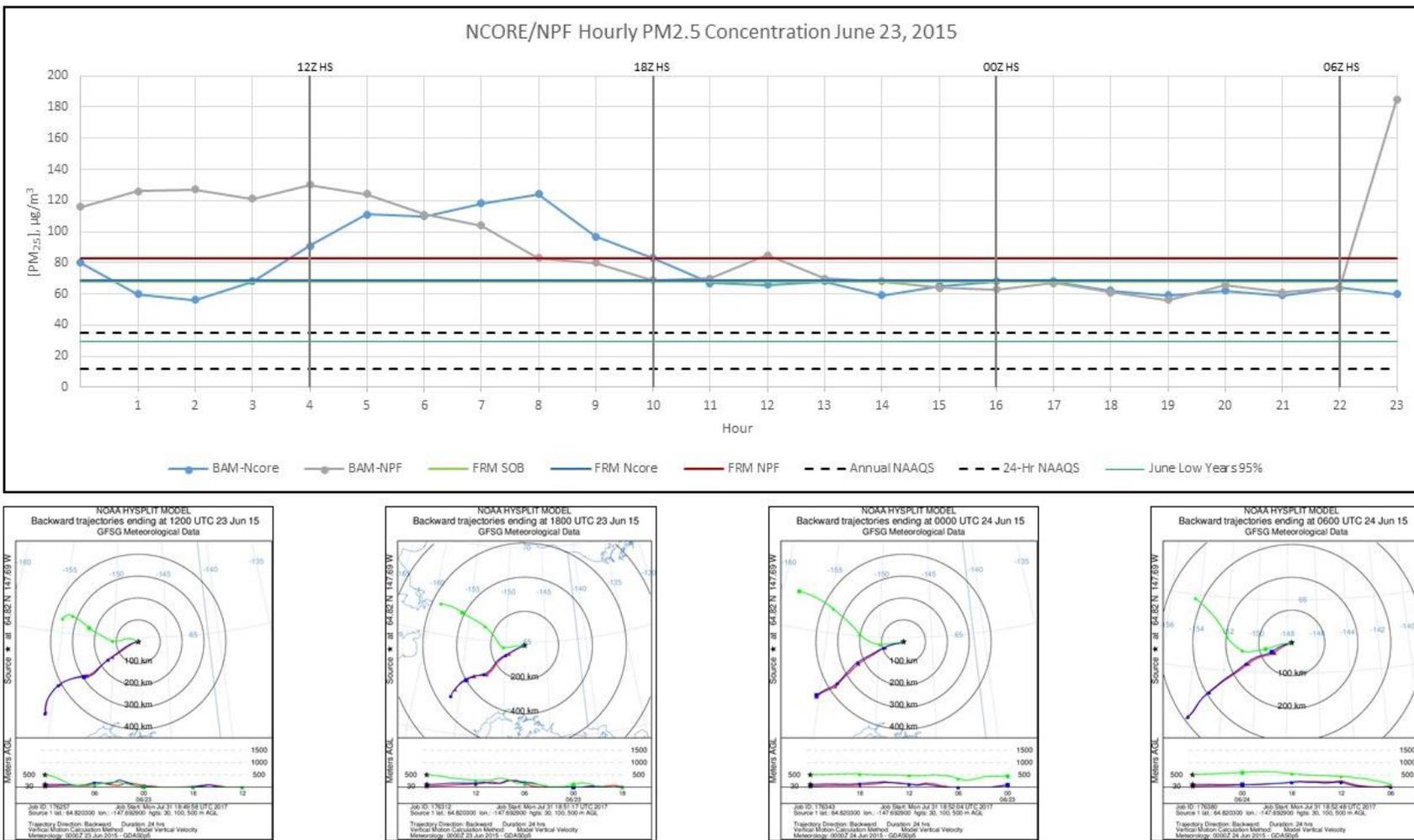


Figure 24. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 23, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 24 depicts elevated hourly PM_{2.5} concentration throughout the day, June 23, 2015. The SOB 24-hour FRM PM_{2.5} concentration was 68.3 µg/m³, NCORE BAM PM_{2.5} 24-

hour concentration was $69.7 \mu\text{g}/\text{m}^3$, NCORE 24-hour FRM $\text{PM}_{2.5}$ concentration was $76.0 \mu\text{g}/\text{m}^3$, NPF continuous BAM $\text{PM}_{2.5}$ 24-hour average concentration was $90.5 \mu\text{g}/\text{m}^3$ and NPF 24-hour FRM $\text{PM}_{2.5}$ concentration was $83.2 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates the flow at all levels, 30m/100m/500m, transitioning through the western fire complex's smoke field. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 25. All fires experienced explosive growth during this period.

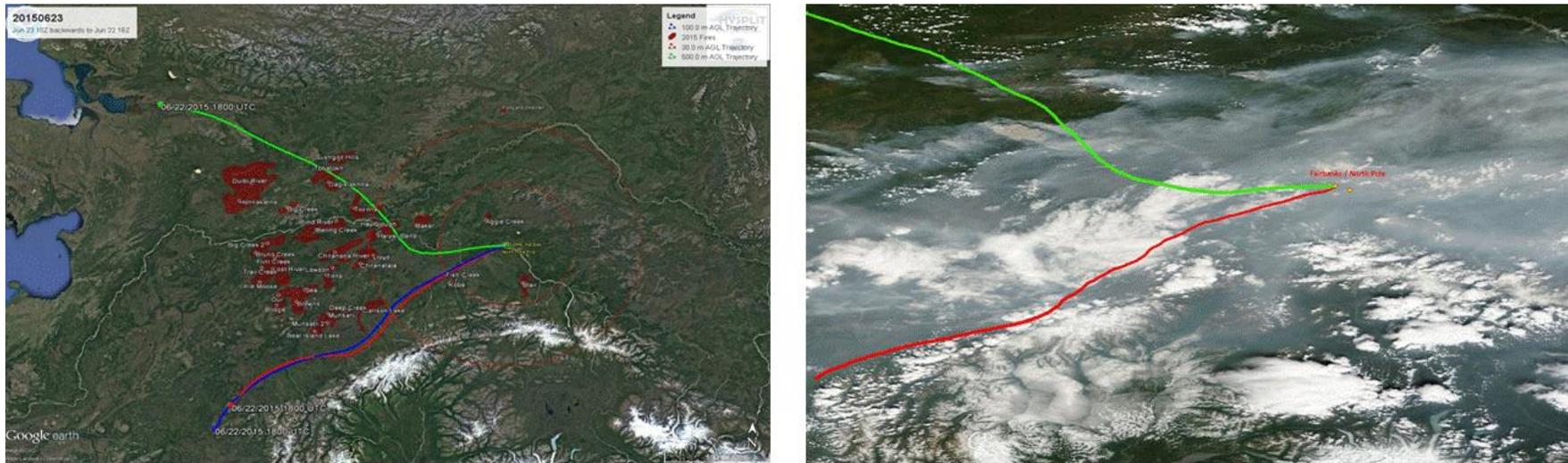


Figure 25. Google Earth with 2015 Fire Perimeters and 23/18Z Hysplit 30m/100m/500m back trajectory. June 23, 2015 MODIS satellite imagery overlaid with 30m/500m trajectory, 23/18Z Hysplit.

MODIS image: Imagery for June 22, 2015 shows the 30m/500m trajectory passing directly through the western fire complex's smoke field. Dense smoke is visible on the imagery throughout the interior of Alaska.

Table 16. Hourly observation for Fairbanks International Airport, June 23, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/23/2015 00:53 AKDT	9	190	**	7 (Smoke)	2	67	49
PAFA	06/23/2015 01:53 AKDT	7	230	**	7 (Smoke)	2	64	48
PAFA	06/23/2015 02:53 AKDT	7	180	**	7 (Smoke)	2	63	50
PAFA	06/23/2015 03:53 AKDT	5	200	**	7 (Smoke)	3	61	50
PAFA	06/23/2015 04:53 AKDT	0	0	**	7 (Smoke)	3	59	50
PAFA	06/23/2015 05:53 AKDT	0	0	**	7 (Smoke)	2	57	50
PAFA	06/23/2015 06:53 AKDT	5	40	**	7 (Smoke)	2	57	52
PAFA	06/23/2015 07:53 AKDT	3	130	**	7 (Smoke)	2	59	51
PAFA	06/23/2015 08:53 AKDT	0	0	**	7 (Smoke)	2	61	52
PAFA	06/23/2015 09:53 AKDT	3	120	**	7 (Smoke)	2	62	52
PAFA	06/23/2015 10:53 AKDT	0	0	**	7 (Smoke)	3	63	52
PAFA	06/23/2015 11:53 AKDT	3	200	**	7 (Smoke)	3	65	54
PAFA	06/23/2015 12:53 AKDT	0	0	**	7 (Smoke)	4	68	56
PAFA	06/23/2015 13:53 AKDT	7	190	**	7 (Smoke)	4	70	55
PAFA	06/23/2015 14:53 AKDT	5	**	**	7 (Smoke)	5	72	55
PAFA	06/23/2015 15:53 AKDT	3	**	**	7 (Smoke)	5	75	54
PAFA	06/23/2015 16:53 AKDT	7	180	**	7 (Smoke)	5	75	53
PAFA	06/23/2015 17:53 AKDT	6	200	**	7 (Smoke)	4	75	52
PAFA	06/23/2015 18:53 AKDT	8	190	**	7 (Smoke)	4	77	51
PAFA	06/23/2015 19:53 AKDT	7	210	**	7 (Smoke)	4	75	52
PAFA	06/23/2015 20:53 AKDT	6	230	**	7 (Smoke)	4	75	53
PAFA	06/23/2015 21:53 AKDT	5	250	**	7 (Smoke)	4	73	54
PAFA	06/23/2015 22:53 AKDT	0	0	**	7 (Smoke)	4	69	56
PAFA	06/23/2015 23:53 AKDT	0	0	**	7 (Smoke)	4	64	56

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility in all 24 hourly observations. The lowest visibility report is two miles which equated to the “Unhealthy” category on the Air Quality Index chart.

June 24, 2015

AICC Report Fire Information: There were 40 new fires reported, for a total of 274 fires burning statewide. For the 2015 fire season 427,881 acres have been burned, and that is a 24-hr increase of 99,757 acres from the previous day.

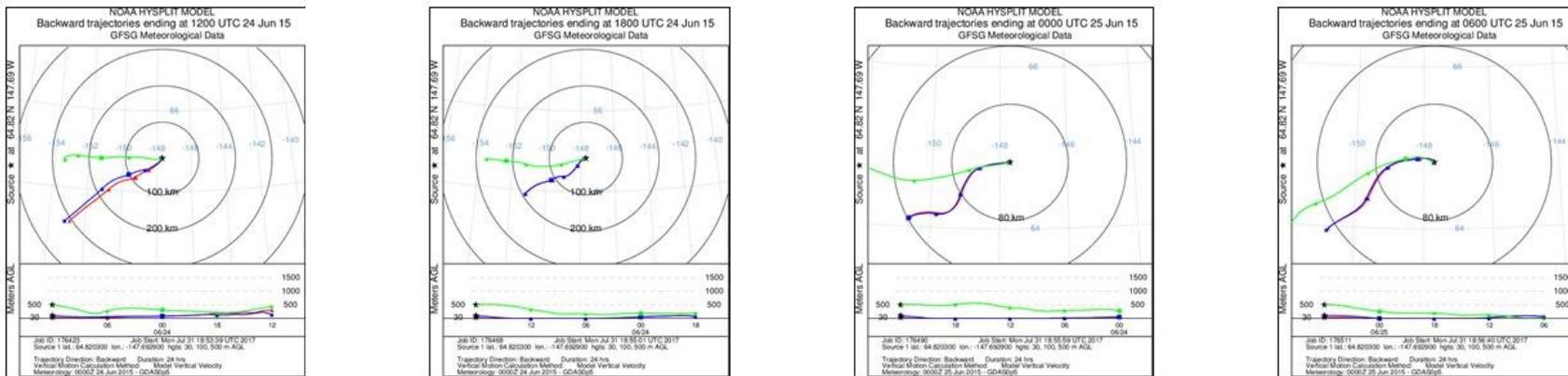
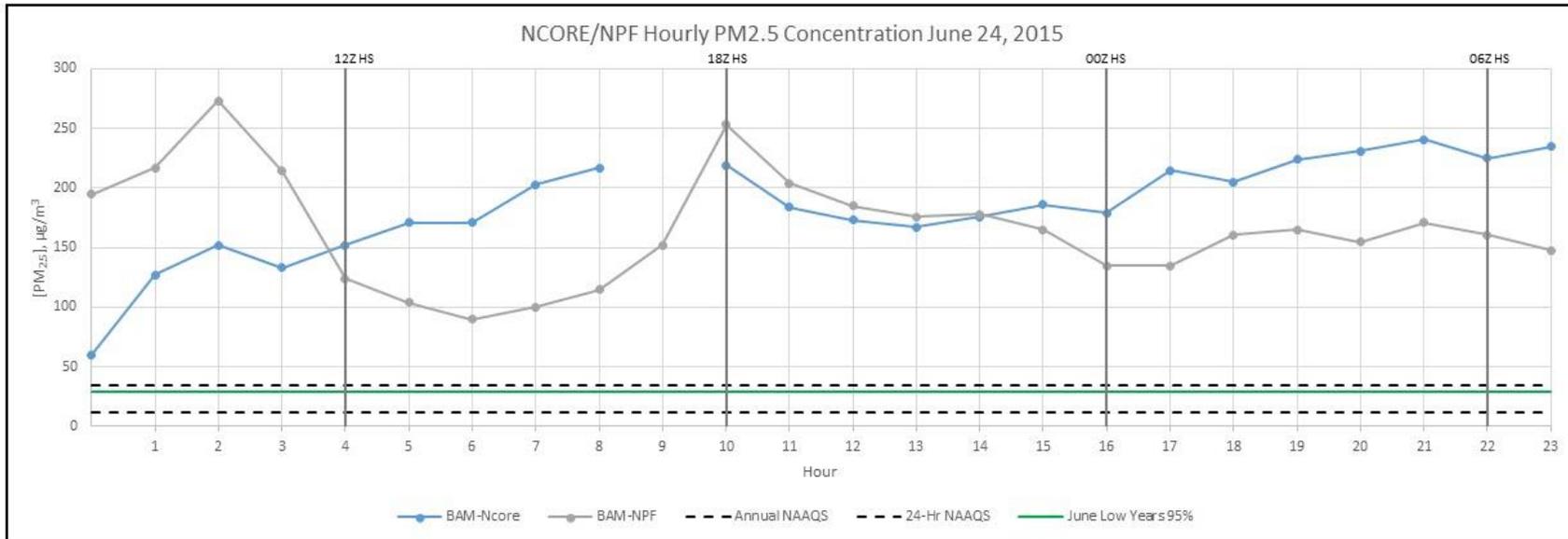


Figure 26. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 24, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 26 depicts extremely high hourly PM_{2.5} concentration throughout the day, June 24, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, , primary

NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM $PM_{2.5}$ 24-hour concentration was $184.6\mu\text{g}/\text{m}^3$, and NPF continuous BAM $PM_{2.5}$ 24-hour average concentration was $165.7\mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates the flow at all levels, 30m/100m/500m, transitioning through the western fire complex's smoke field. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 27. All fires experienced explosive growth during this period.

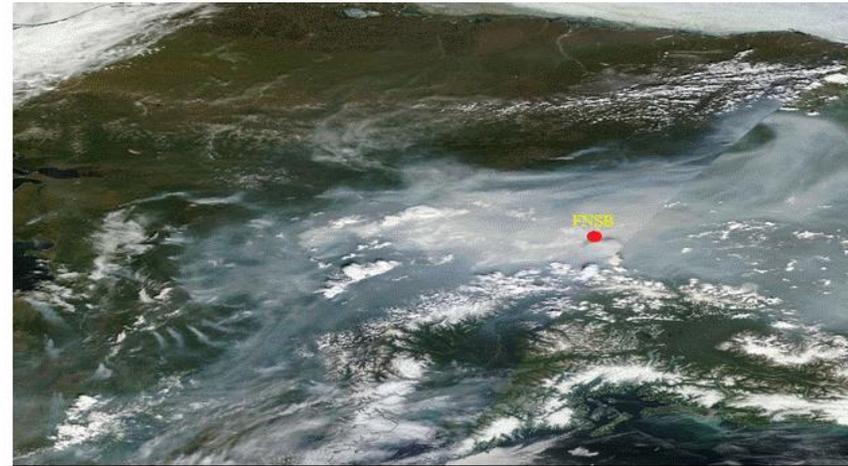
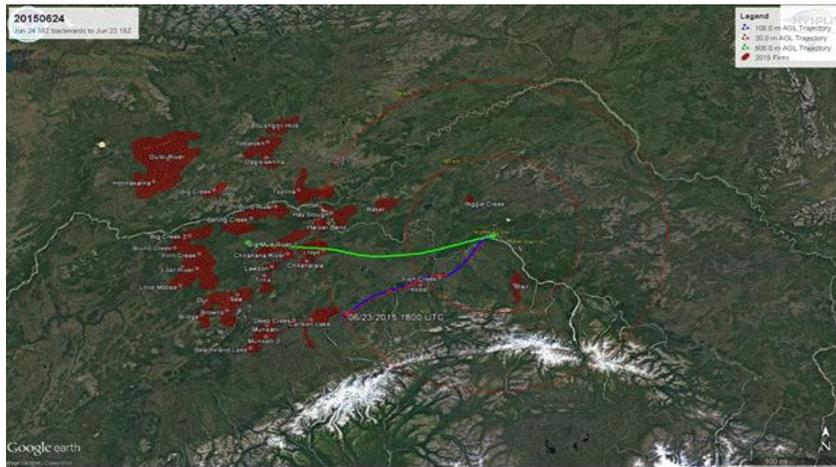


Figure 27. Google Earth with 2015 Fire Perimeters and 24/18Z Hysplit 30m/100m/500m back trajectory. June 24, 2015 MODIS satellite imagery.

MODIS image: Imagery for June 24, 2015 shows the 30m and 500m trajectory passing directly through the western fire complex's smoke field. Dense smoke is visible on the imagery throughout the interior of Alaska.

Table 17. Hourly observation for Fairbanks International Airport, June 24, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/24/2015 00:53 AKDT	0	0	**	7 (Smoke)	4	61	57
PAFA	06/24/2015 01:53 AKDT	3	40	**	7 (Smoke)	3	59	55
PAFA	06/24/2015 02:53 AKDT	0	0	**	7 (Smoke)	2	55	54
PAFA	06/24/2015 03:53 AKDT	3	50	**	7 (Smoke)	2	57	54
PAFA	06/24/2015 04:53 AKDT	3	50	**	7 (Smoke)	2	57	52
PAFA	06/24/2015 05:53 AKDT	3	70	**	7 (Smoke)	2	55	52
PAFA	06/24/2015 06:53 AKDT	0	0	**	7 (Smoke)	1	57	52
PAFA	06/24/2015 07:53 AKDT	0	0	**	7 (Smoke)	2	57	54
PAFA	06/24/2015 08:53 AKDT	0	0	**	7 (Smoke)	2	60	52
PAFA	06/24/2015 09:53 AKDT	0	0	**	7 (Smoke)	1	63	52
PAFA	06/24/2015 10:53 AKDT	0	0	**	7 (Smoke)	1	63	52
PAFA	06/24/2015 11:53 AKDT	0	0	**	7 (Smoke)	1	64	52
PAFA	06/24/2015 12:53 AKDT	0	0	**	7 (Smoke)	1	66	52
PAFA	06/24/2015 13:53 AKDT	0	0	**	7 (Smoke)	1	66	54
PAFA	06/24/2015 14:53 AKDT	0	0	**	7 (Smoke)	2	68	52
PAFA	06/24/2015 15:53 AKDT	0	0	**	7 (Smoke)	2	70	54
PAFA	06/24/2015 16:53 AKDT	0	0	**	7 (Smoke)	2	70	54
PAFA	06/24/2015 17:53 AKDT	0	0	**	7 (Smoke)	1	70	54
PAFA	06/24/2015 18:53 AKDT	0	0	**	7 (Smoke)	1	70	55
PAFA	06/24/2015 19:53 AKDT	0	0	**	7 (Smoke)	1	69	56
PAFA	06/24/2015 20:53 AKDT	0	0	**	7 (Smoke)	1	66	57
PAFA	06/24/2015 21:53 AKDT	0	0	**	7 (Smoke)	1	64	57
PAFA	06/24/2015 22:53 AKDT	0	0	**	7 (Smoke)	1	63	57
PAFA	06/24/2015 23:53 AKDT	0	0	**	7 (Smoke)	1	63	57

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility in all 24 hourly observations. The lowest visibility report is one mile which equated to the “Very Unhealthy” category on the Air Quality Index chart.

June 25, 2015

AICC Report Fire Information: There were 21 new fires reported, for a total of 292 fires burning statewide. For the 2015 fire season 624,496 acres have been burned, and that is a 24-hr increase of 99,757 acres from the previous day.

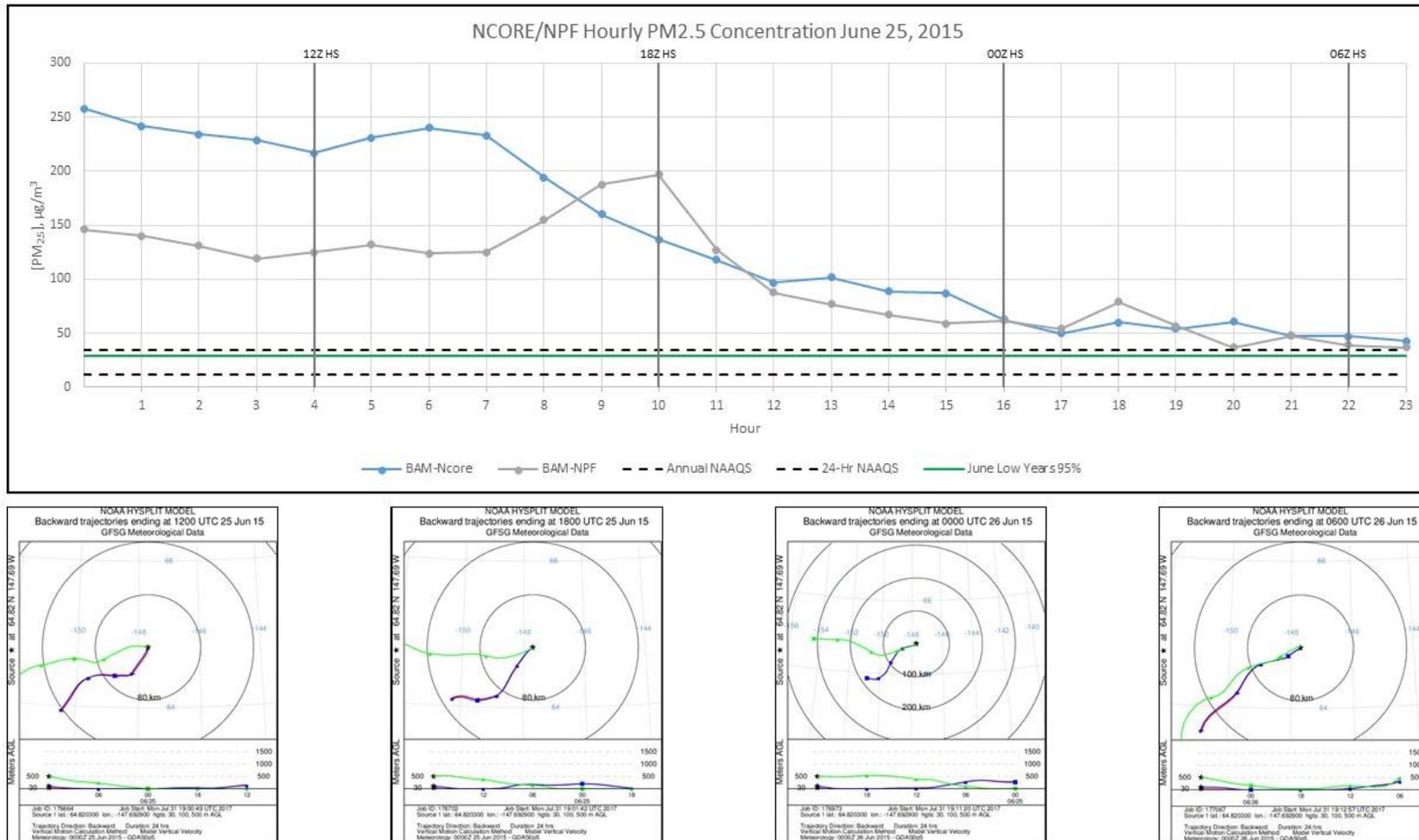


Figure 28. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr. Hysplit runs for June 25, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 28 depicts extremely high hourly PM_{2.5} concentration throughout the day, June 25, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM,

primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 137.3 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 100.5 µg/m³.

HYSPLIT trajectory: Indicates the flow at all levels, 30m/100m/500m, transitioning through the western fire complex's smoke field. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 29. All fires experienced moderate growth during this period.

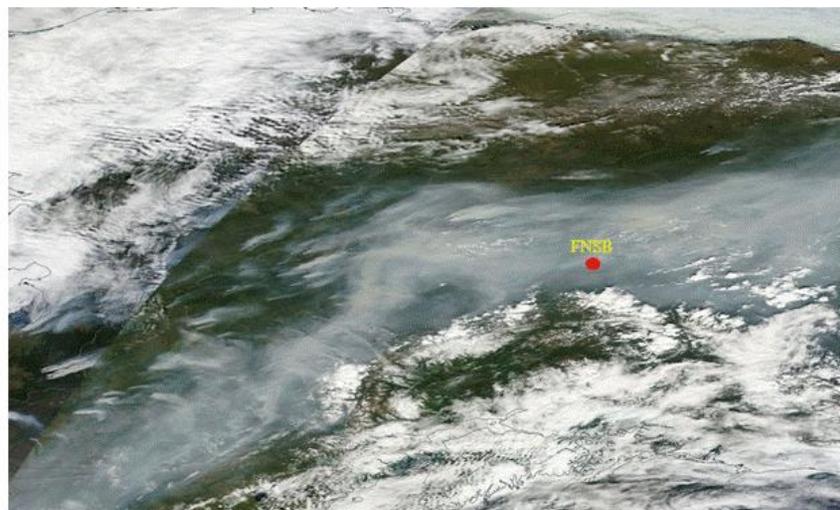
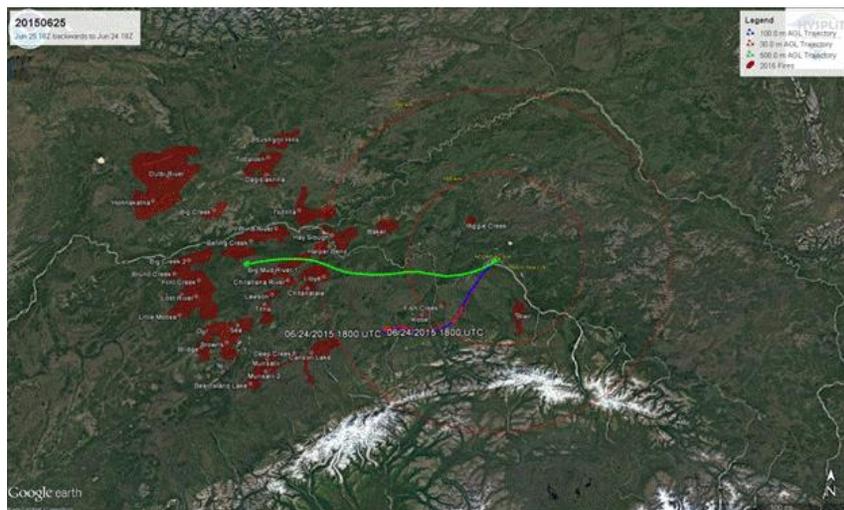


Figure 29. Google Earth with 2015 Fire Perimeters and 25/18Z Hysplit 30m/100m/500m back trajectory. June 25, 2015 MODIS satellite imagery.

MODIS image: Imagery for June 24, 2015 shows the 30m and 500m trajectory passing directly through the western fire complex's smoke field. Dense smoke is visible on the imagery throughout the interior of Alaska.

Table 18. Hourly observation for Fairbanks International Airport, June 25, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/25/2015 00:53 AKDT	0	0	**	7 (Smoke)	1	60	57
PAFA	06/25/2015 01:53 AKDT	0	0	**	7 (Smoke)	1	59	57
PAFA	06/25/2015 02:53 AKDT	0	0	**	7 (Smoke)	1	55	54
PAFA	06/25/2015 03:53 AKDT	0	0	**	7 (Smoke)	1	55	54
PAFA	06/25/2015 04:53 AKDT	0	0	**	7 (Smoke)	1	54	54
PAFA	06/25/2015 05:53 AKDT	0	0	**	7 (Smoke)	1	55	53
PAFA	06/25/2015 06:53 AKDT	0	0	**	7 (Smoke)	1	56	53
PAFA	06/25/2015 07:53 AKDT	3	40	**	7 (Smoke)	1	59	54
PAFA	06/25/2015 08:53 AKDT	5	50	**	7 (Smoke)	1	61	54
PAFA	06/25/2015 09:53 AKDT	3	120	**	7 (Smoke)	1	62	54
PAFA	06/25/2015 10:53 AKDT	3	40	**	7 (Smoke)	1	64	55
PAFA	06/25/2015 11:53 AKDT	0	0	**	7 (Smoke)	2	68	55
PAFA	06/25/2015 12:53 AKDT	0	0	**	7 (Smoke)	2	72	55
PAFA	06/25/2015 13:53 AKDT	0	0	**	7 (Smoke)	2	74	54
PAFA	06/25/2015 14:53 AKDT	3	**	**	7 (Smoke)	2	75	54
PAFA	06/25/2015 15:53 AKDT	5	170	**	7 (Smoke)	3	77	50
PAFA	06/25/2015 16:53 AKDT	0	0	**	7 (Smoke)	3	78	51
PAFA	06/25/2015 17:53 AKDT	7	200	**	7 (Smoke)	4	77	50
PAFA	06/25/2015 18:53 AKDT	5	210	**	7 (Smoke)	4	75	52
PAFA	06/25/2015 19:53 AKDT	6	200	**	7 (Smoke)	4	73	52
PAFA	06/25/2015 20:53 AKDT	7	200	**	7 (Smoke)	4	70	52
PAFA	06/25/2015 21:53 AKDT	5	210	**	7 (Smoke)	4	66	50
PAFA	06/25/2015 22:53 AKDT	3	**	**	7 (Smoke)	5	65	50
PAFA	06/25/2015 23:53 AKDT	6	140	**	7 (Smoke)	5	62	52

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility in all 24 hourly observations. The lowest visibility report is one mile which equated to the “Very Unhealthy” category on the Air Quality Index chart.

June 26, 2015

AICC Report Fire Information: There were 28 new fires reported, for a total of 316 fires burning statewide. For the 2015 fire season 921,716 acres have been burned, and that is a 24-hr increase of 297,220 acres from the previous day.

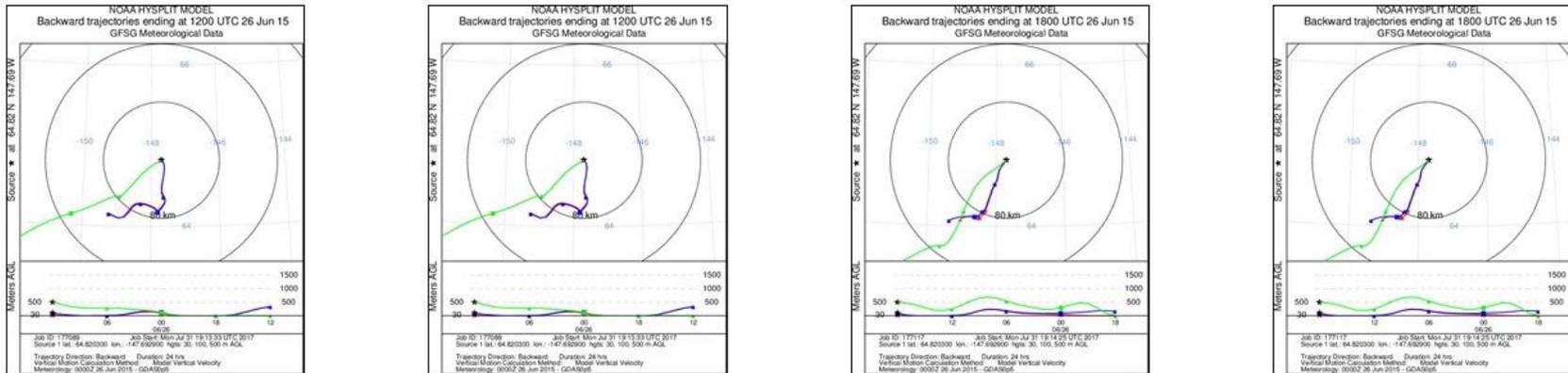
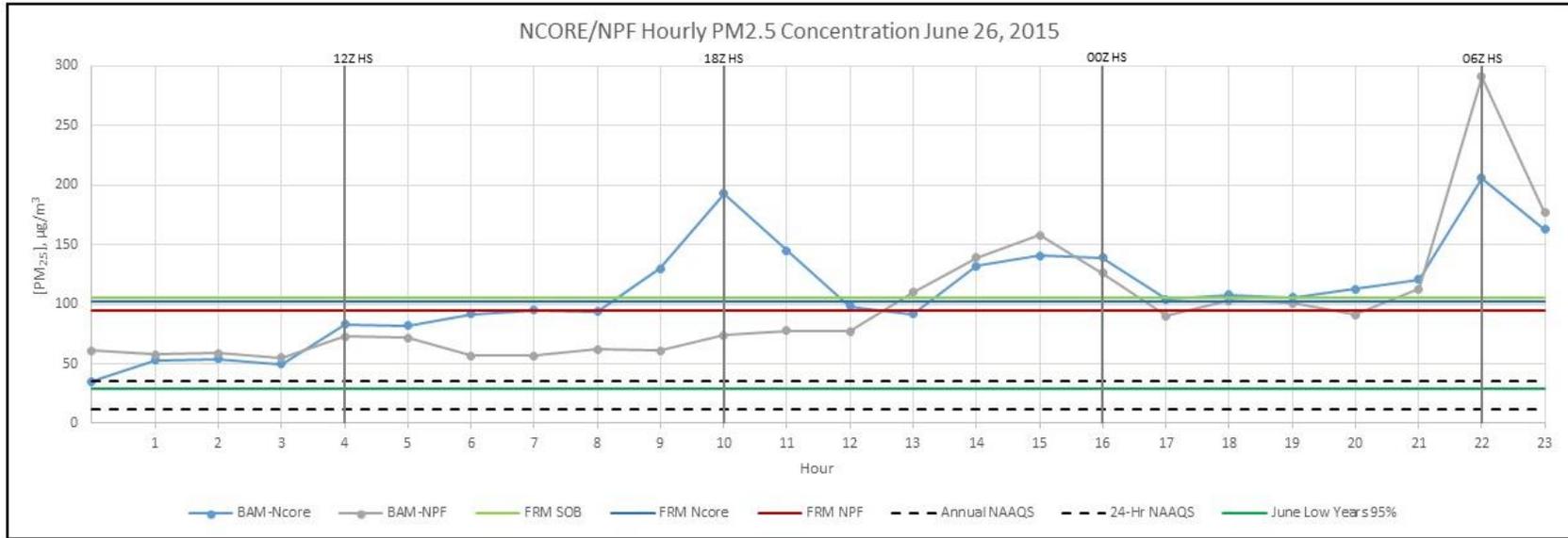


Figure 30. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 26, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 30 depicts extremely high hourly

PM_{2.5} concentration throughout the day, June 26, 2015. The SOB 24-hour FRM PM_{2.5} concentration was 105.0 µg/m³, NCORE BAM PM_{2.5} 24-hour concentration was 109.5 µg/m³, NCORE 24-hour FRM PM_{2.5} concentration was 102.4 µg/m³, NPF continuous BAM PM_{2.5} 24-hour average concentration was 97.6 µg/m³ and NPF 24-hour FRM PM_{2.5} concentration was 95.0 µg/m³.

HYSPLIT trajectory: Indicates that flow is from the south southwest, the 30m/100m/500m transition through the western fire complex's smoke field that is trapped below the cloud layers along the Alaska Range's northern slope. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 31. All fires experienced explosive growth during this period.

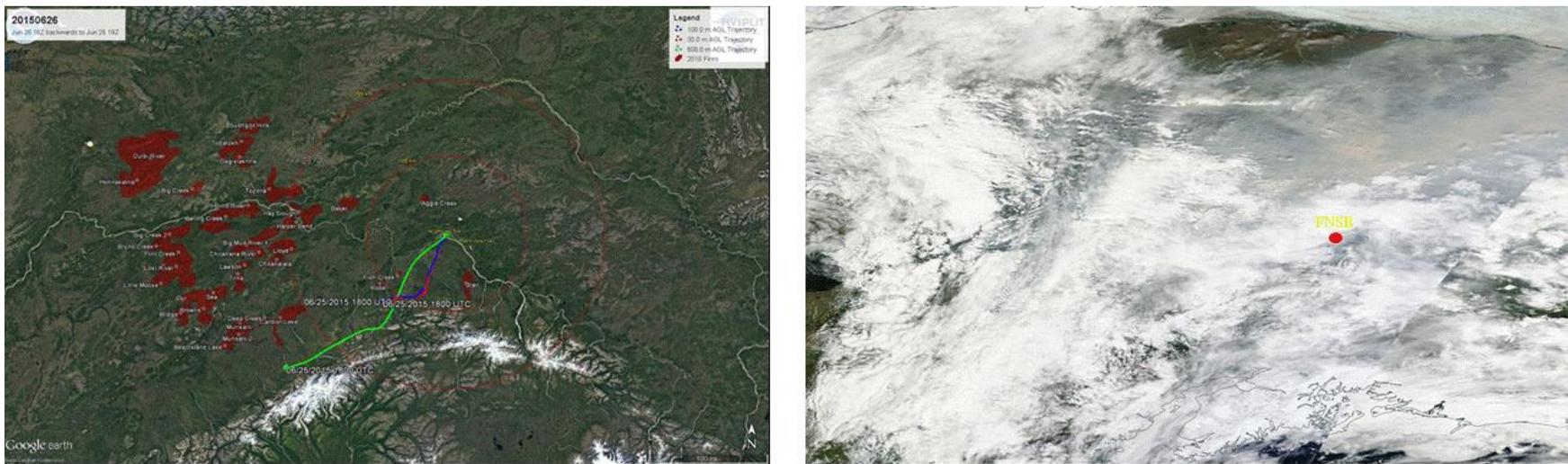


Figure 31. Google Earth with 2015 Fire Perimeters and 26/18Z Hysplit 30m/100m/500m back trajectory. June 26, 2015 MODIS satillite imagery.

MODIS image: Imagery for June 26, 2015 shows the 30m and 500m trajectory passing directly through the western fire complex's smoke field that is trapped below the cloud layers along the Alaska Range's northern slope. A mixture of clouds and dense smoke is visible on the imagery throughout the interior of Alaska. The approaching cold front is much needed to start moving the dense smoke out of the interior.

Table 19. Hourly observation for Fairbanks International Airport, June 26, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/26/2015 00:53 AKDT	0	0	**	7 (Smoke)	6	62	51
PAFA	06/26/2015 01:53 AKDT	3	40	**	7 (Smoke)	6	61	52
PAFA	06/26/2015 02:53 AKDT	0	0	**	7 (Smoke)	4	60	51
PAFA	06/26/2015 03:53 AKDT	0	0	**	7 (Smoke)	4	59	54
PAFA	06/26/2015 04:53 AKDT	3	20	**	7 (Smoke)	3	58	53
PAFA	06/26/2015 05:53 AKDT	3	40	**	7 (Smoke)	3	57	54
PAFA	06/26/2015 06:53 AKDT	0	0	**	7 (Smoke)	3	57	54
PAFA	06/26/2015 07:53 AKDT	7	350	**	7 (Smoke)	2	61	54
PAFA	06/26/2015 08:53 AKDT	0	0	**	7 (Smoke)	3	59	54
PAFA	06/26/2015 09:53 AKDT	0	0	**	7 (Smoke)	2	57	55
PAFA	06/26/2015 10:53 AKDT	0	0	**	7 (Smoke)	2	57	55
PAFA	06/26/2015 11:53 AKDT	0	0	**	7 (Smoke)	2	58	54
PAFA	06/26/2015 12:53 AKDT	3	130	**	7 (Smoke)	2	59	55
PAFA	06/26/2015 13:53 AKDT	6	40	**	7 (Smoke)	2	61	55
PAFA	06/26/2015 14:53 AKDT	5	30	**	7 (Smoke)	2	64	54
PAFA	06/26/2015 15:53 AKDT	0	0	**	7 (Smoke)	2	65	54
PAFA	06/26/2015 16:53 AKDT	0	0	**	7 (Smoke)	2	63	55
PAFA	06/26/2015 17:53 AKDT	3	260	**	7 (Smoke)	2	67	54
PAFA	06/26/2015 18:53 AKDT	6	250	**	7 (Smoke)	3	66	54
PAFA	06/26/2015 19:53 AKDT	6	250	**	7 (Smoke)	2	64	55
PAFA	06/26/2015 20:53 AKDT	3	210	**	7 (Smoke)	2	64	55
PAFA	06/26/2015 21:53 AKDT	3	270	**	7 (Smoke)	2	62	55
PAFA	06/26/2015 22:53 AKDT	7	240	**	7 (Smoke)	1	61	50
PAFA	06/26/2015 23:53 AKDT	3	240	**	7 (Smoke)	2	57	50

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility in all 24 hourly observations. The lowest visibility report is one mile which equated to the “Very Unhealthy” category on the Air Quality Index chart.

June 27, 2015

AICC Report Fire Information: There were 9 new fires reported, for a total of 319 fires burning statewide. For the 2015 fire season 1,189,837 acres have been burned, and that is a 24-hr increase of 268,121 acres from the previous day.

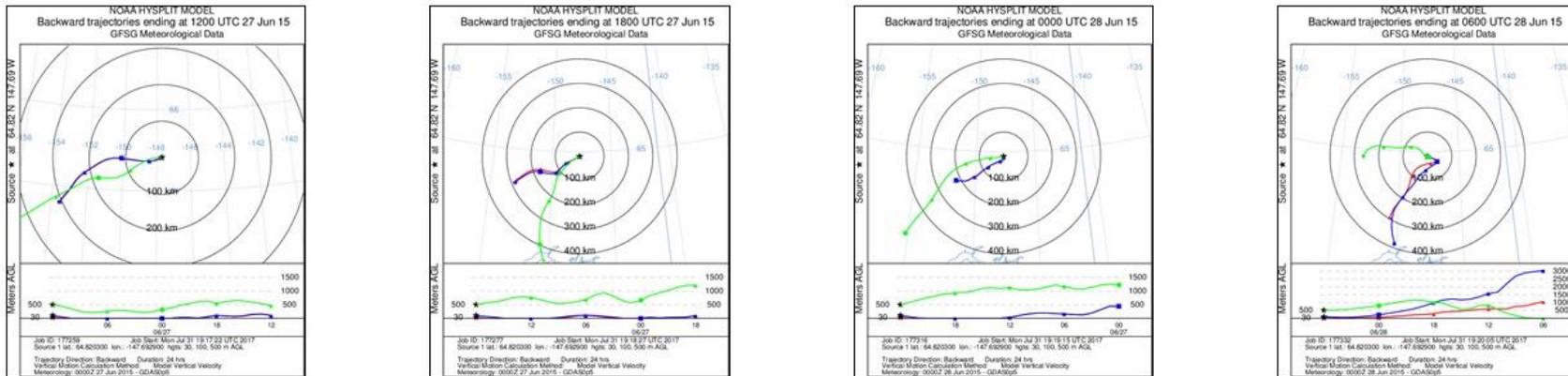
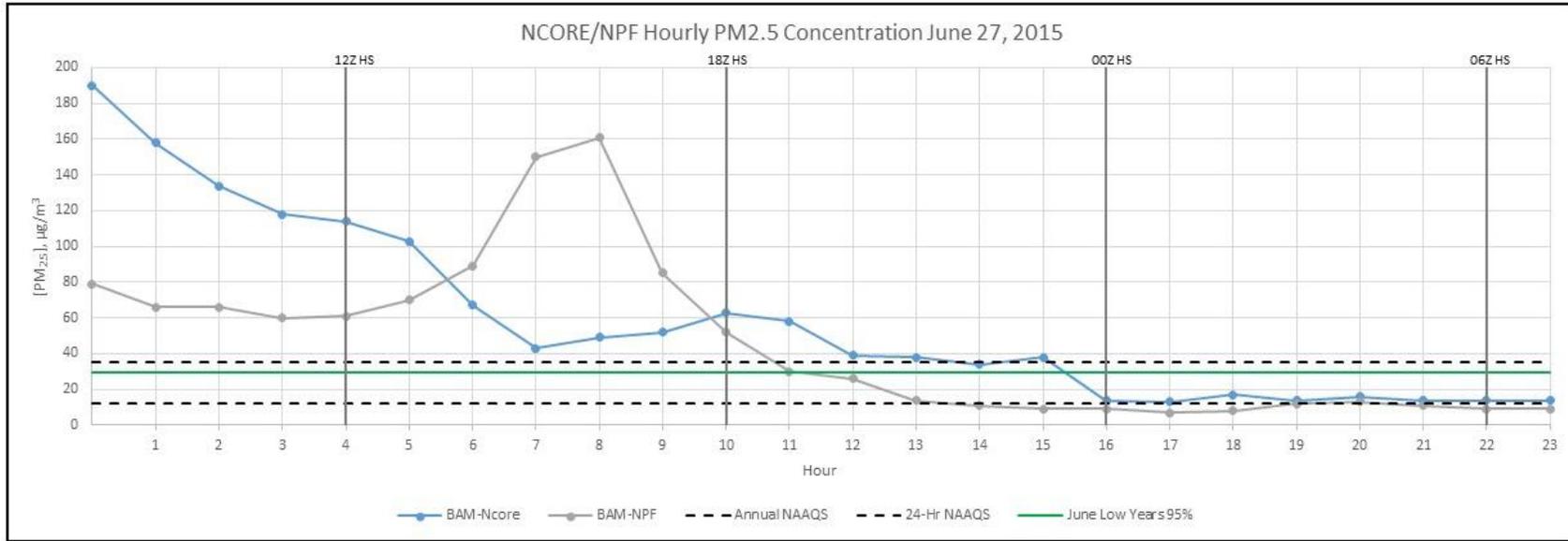


Figure 32. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 27, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 32 depicts extremely high hourly

PM_{2.5} concentration throughout the day, June 27, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 58.9 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 46.1 µg/m³.

HYSPLIT trajectory: Indicates that flow is from the south southwest, the 30m/100m/500m transition through the western fire complex to the west. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 33. The fires to the northwest experienced explosive growth during the period, the 28/06Z (2200L) 500m trajectory does not intersect that smoke from the northwest fires until later in the evening. As a result the air quality gradually increased thought the day.

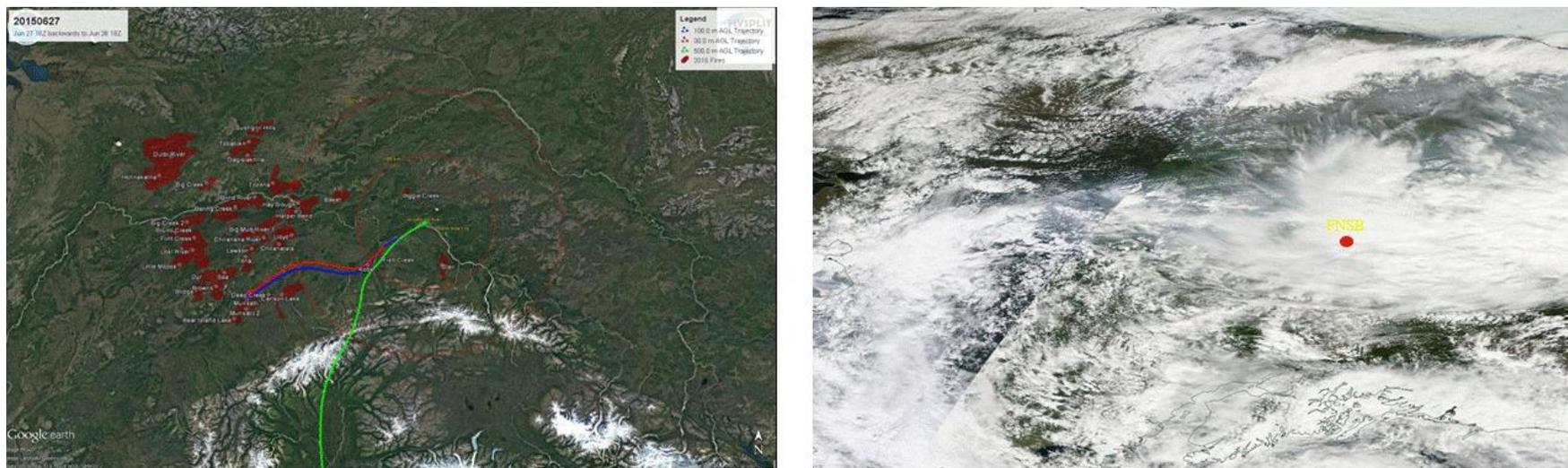


Figure 33. Google Earth with 2015 Fire Perimeters and 27/18Z Hysplit 30m/100m/500m back trajectory. June 27, 2015 MODIS satillite imagery.

MODIS image: Imagery for June 27, 2015 shows a mixture of clouds and smoke, the shortwave trough moved through the region clearing out the interior. The majority of the dense smoke has been advected to the northeast.

Table 20. Hourly observation for Fairbanks International Airport, June 27, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/27/2015 00:53 AKDT	5	220	**	7 (Smoke)	2	57	52
PAFA	06/27/2015 01:53 AKDT	0	0	**	7 (Smoke)	2	57	52
PAFA	06/27/2015 02:53 AKDT	0	0	**	7 (Smoke)	3	55	52
PAFA	06/27/2015 03:53 AKDT	3	30	**	7 (Smoke)	3	54	52
PAFA	06/27/2015 04:53 AKDT	3	10	**	7 (Smoke)	3	55	51
PAFA	06/27/2015 05:53 AKDT	0	0	**	7 (Smoke)	3	55	54
PAFA	06/27/2015 06:53 AKDT	0	0	**	7 (Smoke)	3	55	52
PAFA	06/27/2015 07:53 AKDT	3	200	**	7 (Smoke)	3	55	54
PAFA	06/27/2015 08:53 AKDT	3	230	**	7 (Smoke)	2	55	54
PAFA	06/27/2015 09:53 AKDT	3	220	**	7 (Smoke)	2	55	54
PAFA	06/27/2015 10:53 AKDT	3	200	**	7 (Smoke)	2	55	54
PAFA	06/27/2015 11:53 AKDT	7	190	**	7 (Smoke)	2	55	54
PAFA	06/27/2015 12:53 AKDT	5	210	**	7 (Smoke)	2	55	54
PAFA	06/27/2015 13:53 AKDT	6	180	**	7 (Smoke)	2	57	54
PAFA	06/27/2015 14:53 AKDT	3	190	**	7 (Smoke)	3	57	54
PAFA	06/27/2015 15:53 AKDT	5	130	**	7 (Smoke)	5	58	53
PAFA	06/27/2015 16:53 AKDT	8	130	**	7 (Smoke)	3	57	54
PAFA	06/27/2015 17:53 AKDT	5	120	**	7 (Smoke)	6	55	54
PAFA	06/27/2015 18:53 AKDT	3	110	**	7 (Smoke)	6	56	53
PAFA	06/27/2015 19:53 AKDT	3	80	**	7 (Smoke)	6	57	54
PAFA	06/27/2015 20:53 AKDT	3	60	**	7 (Smoke)	6	56	52
PAFA	06/27/2015 21:53 AKDT	5	50	**	7 (Smoke)	6	55	52
PAFA	06/27/2015 22:53 AKDT	6	20	**	7 (Smoke)	6	55	52
PAFA	06/27/2015 23:53 AKDT	3	50	**	**	10	54	52

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility in all but one of the 24 hourly observations. The lowest visibility report is two miles which equated to the “Unhealthy” category on the Air Quality Index chart.

June 28, 2015

AICC Report Fire Information: There were 3 new fires reported, for a total of 317 fires burning statewide. For the 2015 fire season 1,415,163 acres have been burned, and that is a 24-hr increase of 225,326 acres from the previous day.

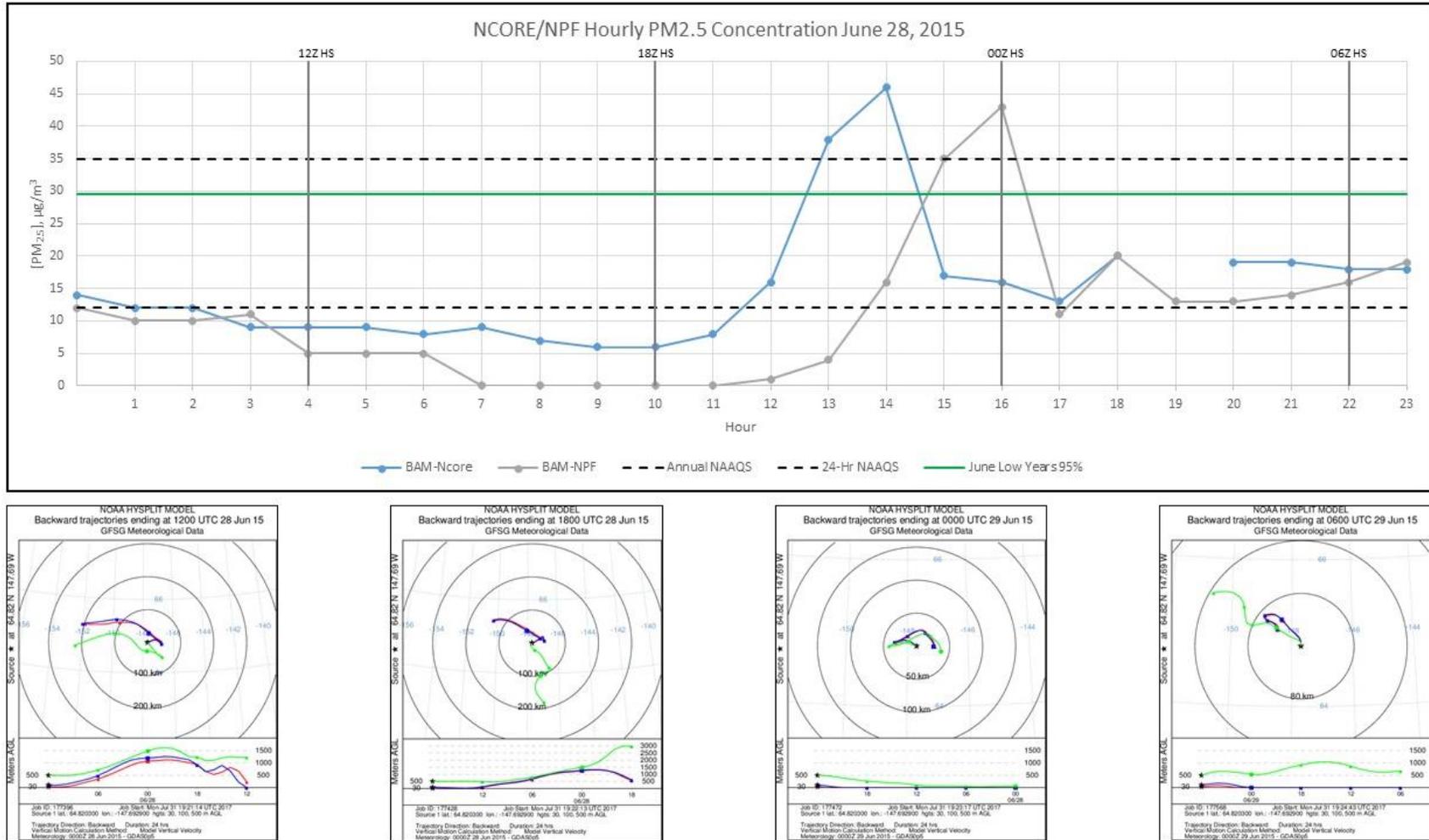


Figure 34. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for June 28, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 34 depicts relatively low hourly PM_{2.5}

concentration in the morning hours but then slightly increasing later in the day, June 28, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, , primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 15.2 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 11.0 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30m/100m/500m levels from the west northwest for the majority of the day. The 18Z Hysplit 30m/100m/500m run has been overlaid on the Google Earth image, Figure 35. The fires to the west northwest have experienced moderate growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

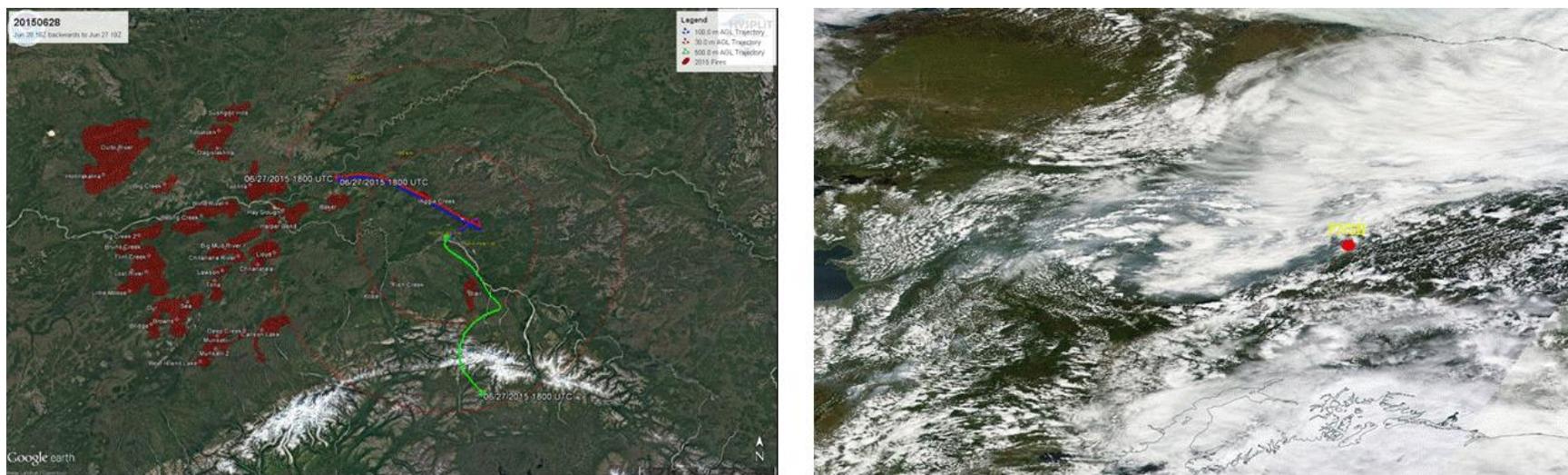


Figure 35. Google Earth with 2015 Fire Perimeters and 28/18Z Hysplit 30m/100m/500m back trajectory. June 28, 2015 MODIS satillite imagery.

MODIS image: Imagery for June 28, 2015 shows the 30m trajectory passing directly through the western fire complex’s smoke field. The rain showers associated with the clouds to the west will help rain out a significant amount of smoke from the atmosphere.

Table 21. Hourly observation for Fairbanks International Airport, June 28, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/28/2015 00:53 AKDT	6	360	**	**	10	54	52
PAFA	06/28/2015 01:53 AKDT	5	10	**	**	10	54	50
PAFA	06/28/2015 02:53 AKDT	5	20	**	**	10	52	50
PAFA	06/28/2015 03:53 AKDT	3	350	**	**	10	52	49
PAFA	06/28/2015 04:53 AKDT	3	10	**	**	10	52	49
PAFA	06/28/2015 05:53 AKDT	3	350	**	9 (Fog)	10	54	48
PAFA	06/28/2015 06:53 AKDT	3	70	**	9 (Fog)	10	55	50
PAFA	06/28/2015 07:53 AKDT	0	0	**	**	10	57	50
PAFA	06/28/2015 08:53 AKDT	0	0	**	**	10	57	52
PAFA	06/28/2015 09:53 AKDT	3	**	**	**	10	61	50
PAFA	06/28/2015 10:53 AKDT	0	0	**	**	10	63	48
PAFA	06/28/2015 11:53 AKDT	5	**	**	**	10	65	49
PAFA	06/28/2015 12:53 AKDT	3	**	**	**	10	66	49
PAFA	06/28/2015 13:53 AKDT	8	310	**	**	10	64	50
PAFA	06/28/2015 14:53 AKDT	9	360	**	7 (Smoke)	5	67	52
PAFA	06/28/2015 15:53 AKDT	10	330	**	7 (Smoke)	6	68	48
PAFA	06/28/2015 16:53 AKDT	12	10	**	7 (Smoke)	6	68	46
PAFA	06/28/2015 17:53 AKDT	8	310	**	7 (Smoke)	6	66	47
PAFA	06/28/2015 18:53 AKDT	8	330	**	7 (Smoke)	6	65	47
PAFA	06/28/2015 19:53 AKDT	5	330	**	7 (Smoke)	6	65	48
PAFA	06/28/2015 20:53 AKDT	5	320	**	7 (Smoke)	6	66	46
PAFA	06/28/2015 21:53 AKDT	5	360	**	**	10	64	48
PAFA	06/28/2015 22:53 AKDT	0	0	**	**	10	60	49
PAFA	06/28/2015 23:53 AKDT	6	340	**	**	10	58	49

Surface observations: Table 18 show the morning winds out of the north, once the winds shifted to a northwesterly component smoke from the western fire complex advected into Fairbanks. This is reflected in the 1500-2100 surface observations at Fairbanks International Airport.

June 29 and 30, 2015 are not included as part of this event, the Annual NAAQS was not exceeded for those days. The smoke plume from the western fire complex was pushed to the north, on the south side of the Brooks Range. Winds would shift late on the 30th, directing the smoke plume back towards FNSB and increasing PM_{2.5} concentrations on July 1, 2015.

July 1, 2015

AICC Report Fire Information: There were 3 new fires reported, for a total of 298 fires burning statewide. For the 2015 fire season 1,884,759 acres have been burned, and that is a 24-hr increase of 271,619 acres from the previous day.

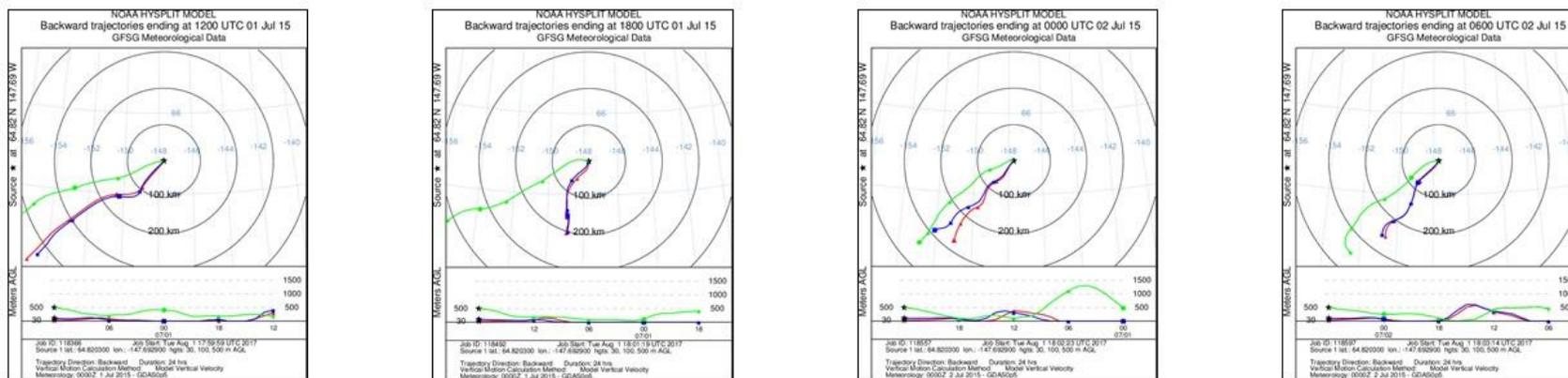
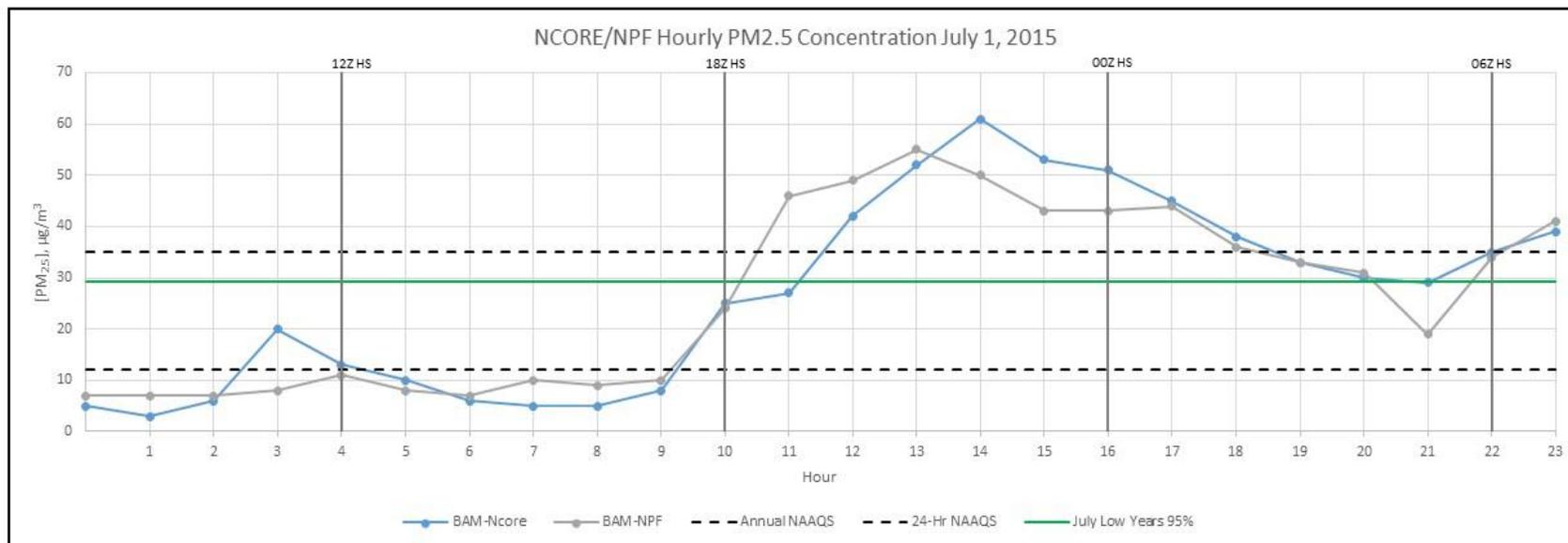


Figure 36. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 1, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 36 depicts relatively low hourly PM_{2.5}

concentration in the morning hours but then slightly increasing later in the day, July 1, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 26.7 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 26.3 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 37. The fires to the west have experienced moderate growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

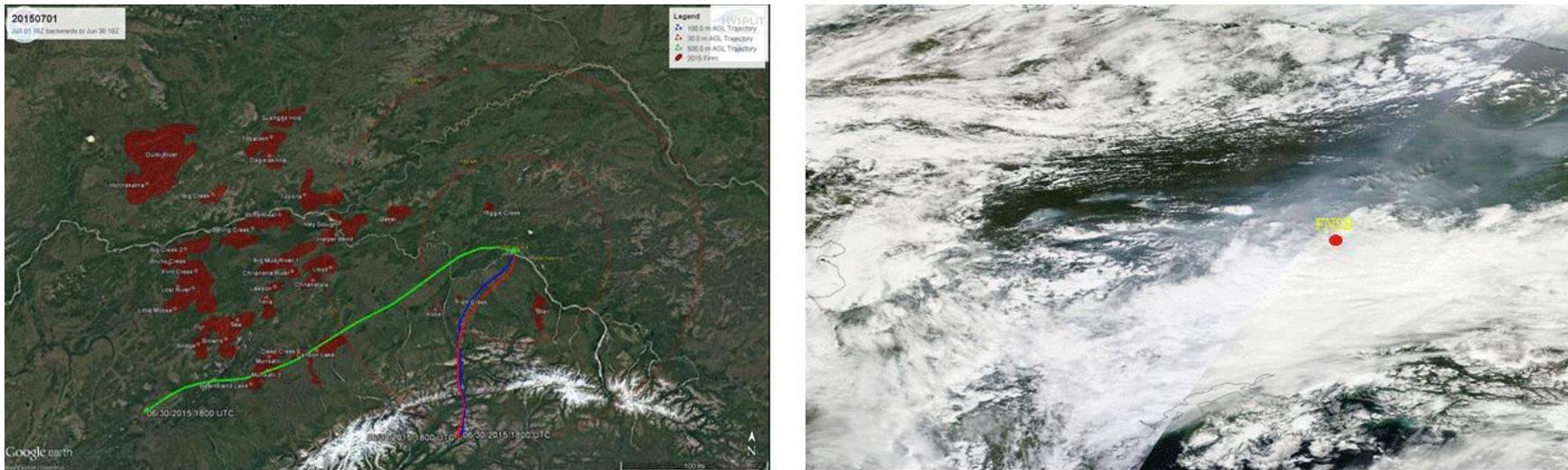


Figure 37. Google Earth with 2015 Fire Perimeters and 01/18Z Hysplit 30m/100m/500m back trajectory. July 1, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 01, 2015 shows the 30m and 500m trajectory passing directly through the western fire complex's smoke field that is trapped below the cloud layers along the Alaska Range's northern slope. A mixture of clouds and dense smoke is visible on the imagery throughout the interior of Alaska.

Table 22. Hourly observation for Fairbanks International Airport, July 1, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/01/2015 00:53 AKDT	9	150	**	7 (Smoke)	5	55	54
PAFA	07/01/2015 01:53 AKDT	5	210	**	7 (Smoke)	6	55	52
PAFA	07/01/2015 02:53 AKDT	0	0	**	7 (Smoke)	5	55	53
PAFA	07/01/2015 03:53 AKDT	3	190	**	7 (Smoke)	4	55	54
PAFA	07/01/2015 04:53 AKDT	5	140	**	7 (Smoke)	4	55	54
PAFA	07/01/2015 05:53 AKDT	5	130	**	7 (Smoke)	6	54	54
PAFA	07/01/2015 06:53 AKDT	3	160	**	**	7	54	52
PAFA	07/01/2015 07:53 AKDT	3	170	**	**	10	55	52
PAFA	07/01/2015 08:53 AKDT	3	200	**	**	10	55	52
PAFA	07/01/2015 09:53 AKDT	0	0	**	**	10	55	52
PAFA	07/01/2015 10:53 AKDT	5	240	**	**	7	56	52
PAFA	07/01/2015 11:53 AKDT	8	240	**	**	7	55	52
PAFA	07/01/2015 12:53 AKDT	7	240	**	7 (Smoke)	6	55	52
PAFA	07/01/2015 13:53 AKDT	6	240	**	7 (Smoke)	3	57	53
PAFA	07/01/2015 14:53 AKDT	6	210	**	7 (Smoke)	3	59	53
PAFA	07/01/2015 15:53 AKDT	5	210	**	7 (Smoke)	3	59	54
PAFA	07/01/2015 16:53 AKDT	6	200	**	7 (Smoke)	3	59	54
PAFA	07/01/2015 17:53 AKDT	5	210	**	7 (Smoke)	3	60	54
PAFA	07/01/2015 18:53 AKDT	6	210	**	7 (Smoke)	3	61	54
PAFA	07/01/2015 19:53 AKDT	7	190	**	7 (Smoke)	3	61	54
PAFA	07/01/2015 20:53 AKDT	6	210	**	7 (Smoke)	3	59	54
PAFA	07/01/2015 21:53 AKDT	5	210	**	7 (Smoke)	5	57	54
PAFA	07/01/2015 22:53 AKDT	8	170	**	7 (Smoke)	3	56	53
PAFA	07/01/2015 23:53 AKDT	0	0	**	7 (Smoke)	3	55	54

Surface observations: Table 19 show the morning winds were light and variable with a slight visibility drop due to smoke. After the late morning inversion break, then the predominant wind direction was out of the southwest, smoke advected into the area decreasing visibility to 3miles with smoke.

July 2, 2015

AICC Report Fire Information: There was 1 new fire reported, for a total of 299 fires burning statewide. For the 2015 fire season 2,128,750 acres have been burned, and that is a 24-hr increase of 243,991 acres from the previous day.

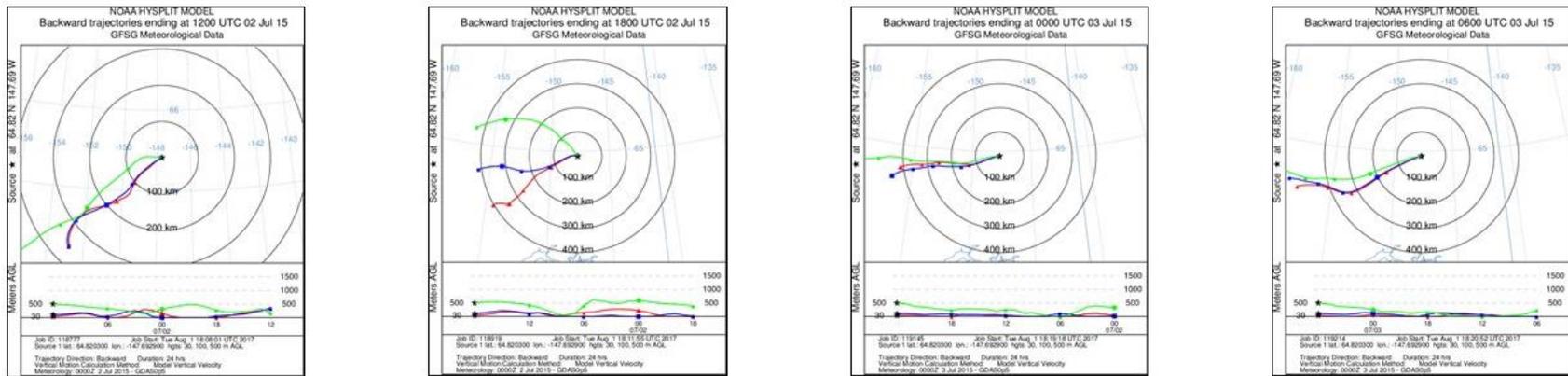
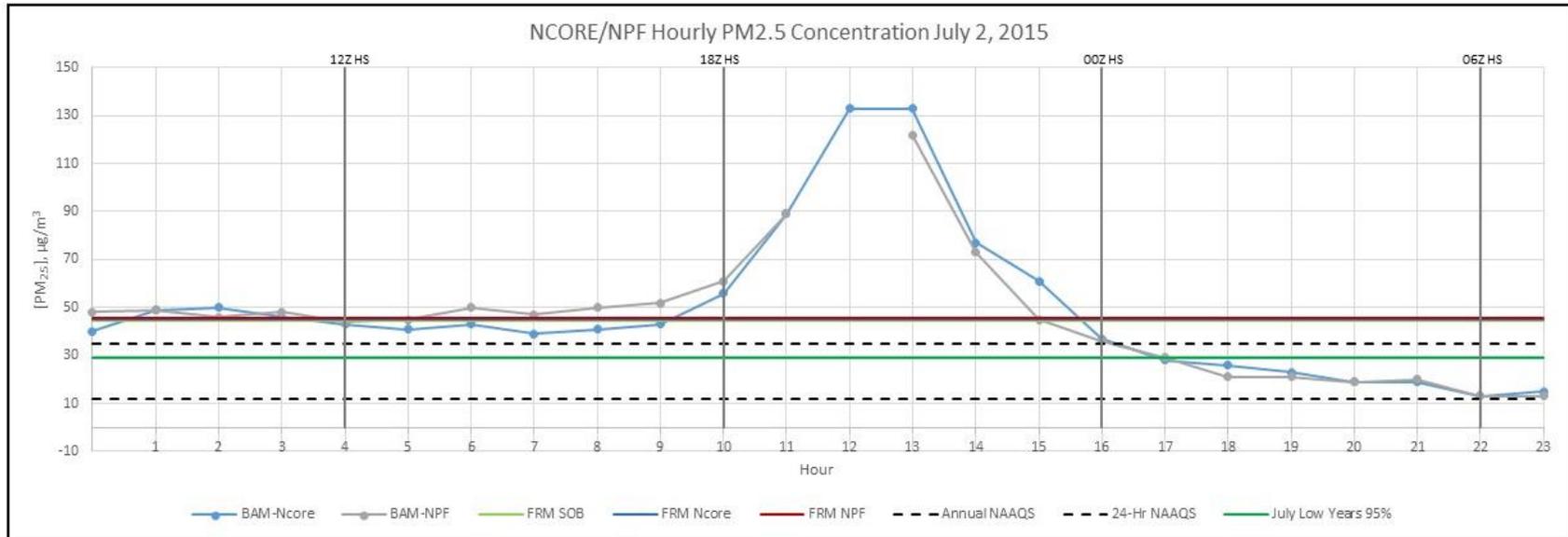


Figure 38. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 2, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 38 depicts extremely high hourly

PM_{2.5} concentration throughout the day, July 2, 2015. The SOB 24-hour FRM PM_{2.5} concentration was 44.3 μg/m³, NCORE BAM PM_{2.5} 24-hour concentration was 48.5 μg/m³, NCORE 24-hour FRM PM_{2.5} concentration was 45.2 μg/m³, NPF continuous BAM PM_{2.5} 24-hour average concentration was 45.3 μg/m³ and NPF 24-hour FRM PM_{2.5} concentration was 45.4 μg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from a westerly component throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 39. The fires to the west have experienced moderate growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

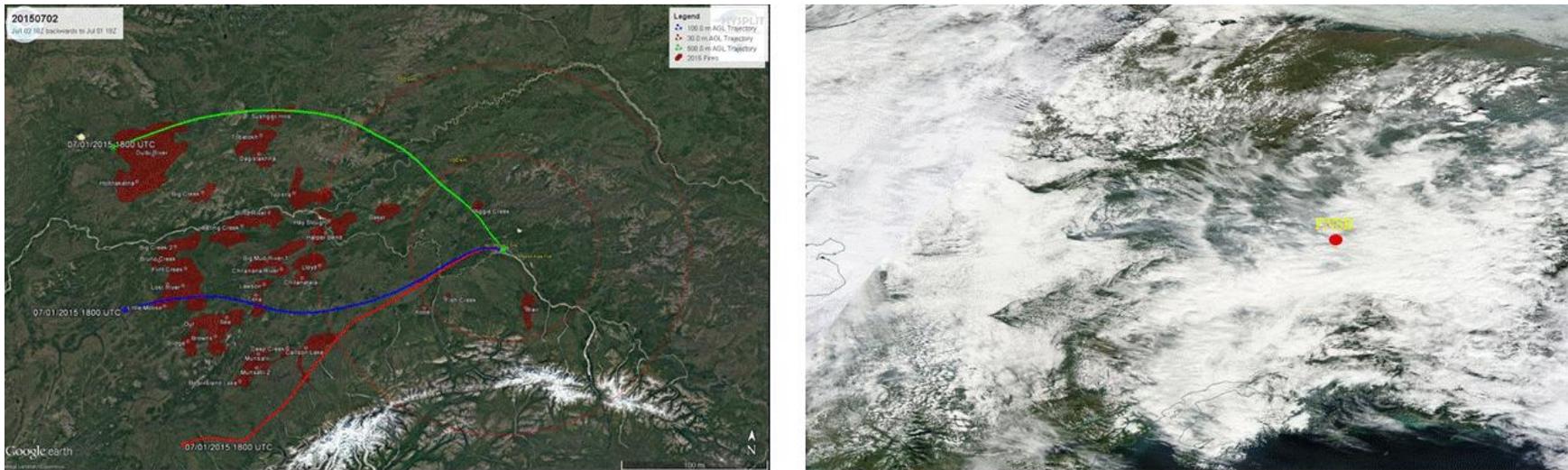


Figure 39. Google Earth with 2015 Fire Perimeters and 02/18Z Hysplit 30m/100m/500m back trajectory. July 2, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 02, 2015 shows the 30m and 500m trajectory passing directly through the western fire complex's smoke field that is trapped below the central interior cloud layers. A mixture of clouds and smoke are visible on the imagery throughout the interior of Alaska.

Table 23. Hourly observation for Fairbanks International Airport, July 2, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/02/2015 00:53 AKDT	6	180	**	7 (Smoke)	2	55	53
PAFA	07/02/2015 01:53 AKDT	5	200	**	7 (Smoke)	2	54	52
PAFA	07/02/2015 02:53 AKDT	6	180	**	7 (Smoke)	2	54	52
PAFA	07/02/2015 03:53 AKDT	3	240	**	7 (Smoke)	2	54	52
PAFA	07/02/2015 04:53 AKDT	0	0	**	7 (Smoke)	2	53	51
PAFA	07/02/2015 05:53 AKDT	3	210	**	7 (Smoke)	2	54	52
PAFA	07/02/2015 06:53 AKDT	3	240	**	7 (Smoke)	3	54	51
PAFA	07/02/2015 07:53 AKDT	3	210	**	7 (Smoke)	3	54	52
PAFA	07/02/2015 08:53 AKDT	5	200	**	7 (Smoke)	3	54	52
PAFA	07/02/2015 09:53 AKDT	6	200	**	7 (Smoke)	3	55	52
PAFA	07/02/2015 10:53 AKDT	5	200	**	7 (Smoke)	3	55	52
PAFA	07/02/2015 11:53 AKDT	5	200	**	7 (Smoke)	2	56	53
PAFA	07/02/2015 12:53 AKDT	5	210	**	7 (Smoke)	2	57	54
PAFA	07/02/2015 13:53 AKDT	9	220	**	7 (Smoke)	2	61	54
PAFA	07/02/2015 14:53 AKDT	9	210	**	7 (Smoke)	2	61	54
PAFA	07/02/2015 15:53 AKDT	13	250	20	7 (Smoke)	3	63	50
PAFA	07/02/2015 16:53 AKDT	7	220	16	7 (Smoke)	3	61	52
PAFA	07/02/2015 17:53 AKDT	9	230	**	7 (Smoke)	5	61	50
PAFA	07/02/2015 18:53 AKDT	10	230	17	7 (Smoke)	6	61	50
PAFA	07/02/2015 19:53 AKDT	6	220	**	**	7	61	50
PAFA	07/02/2015 20:53 AKDT	8	230	**	**	9	61	48
PAFA	07/02/2015 21:53 AKDT	10	240	**	**	10	61	46
PAFA	07/02/2015 22:53 AKDT	5	220	**	**	10	57	46
PAFA	07/02/2015 23:53 AKDT	7	210	**	**	10	55	46

Surface observations: Table 20 show the morning winds were light and variable with a slight visibility drop due to smoke. After the late morning inversion break the southwesterly winds increased slightly throughout the day that helped to clear out the smoke affecting the visibility. The lowest visibility report is two miles which equated to the “Unhealthy” category on the Air Quality Index chart.

July 3, 2015

AICC Report Fire Information: There were 6 new fires reported, for a total of 302 fires burning statewide. For the 2015 fire season 2,227,519 acres have been burned, and that is a 24-hr increase of 98,769 acres from the previous day.

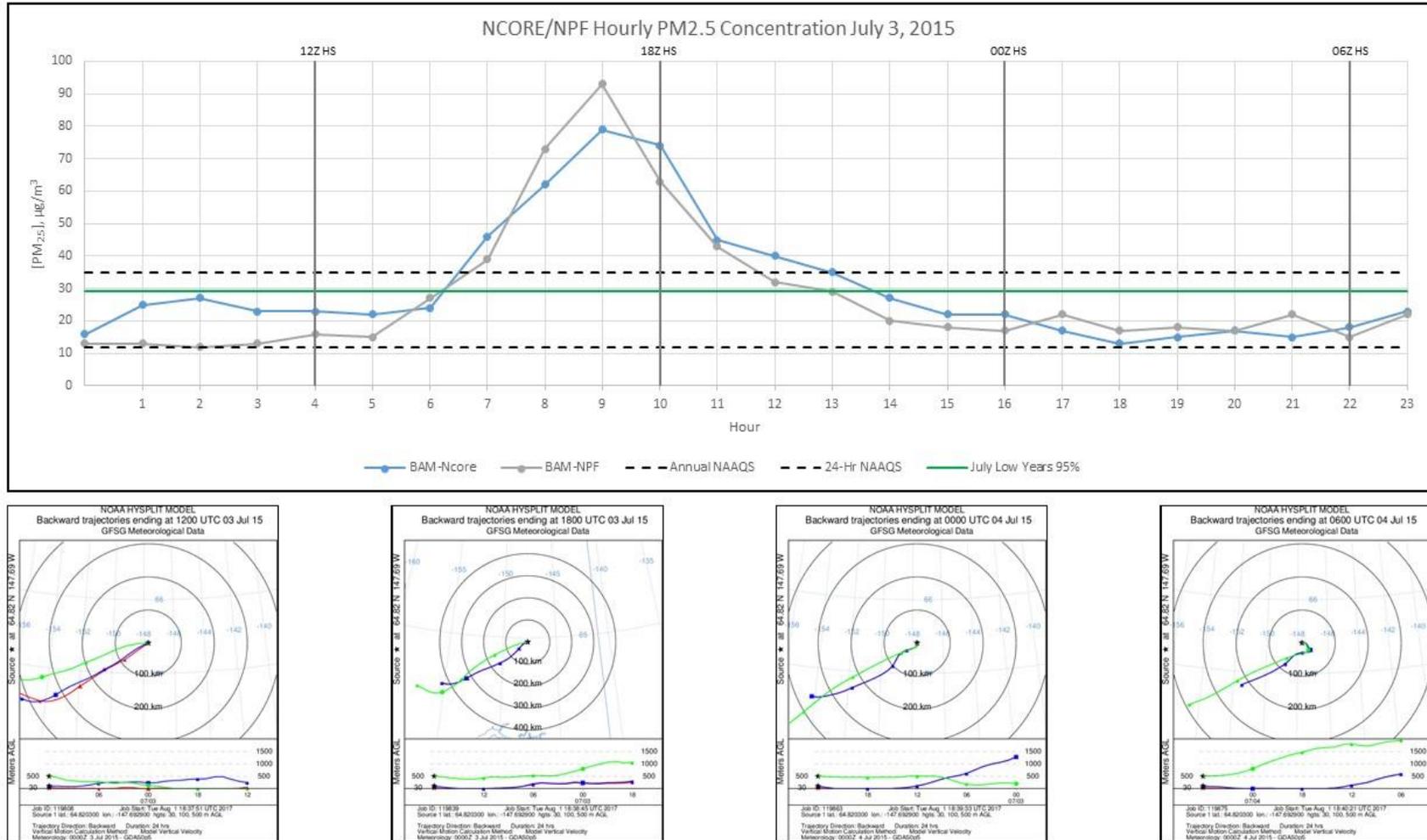


Figure 40. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 3, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 40 depicts relatively low hourly PM_{2.5}

concentration in the morning hours but then slightly increasing later in the day, July 3, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, , primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 30.4 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 27.9 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 41. The fires to the west have experienced moderate growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

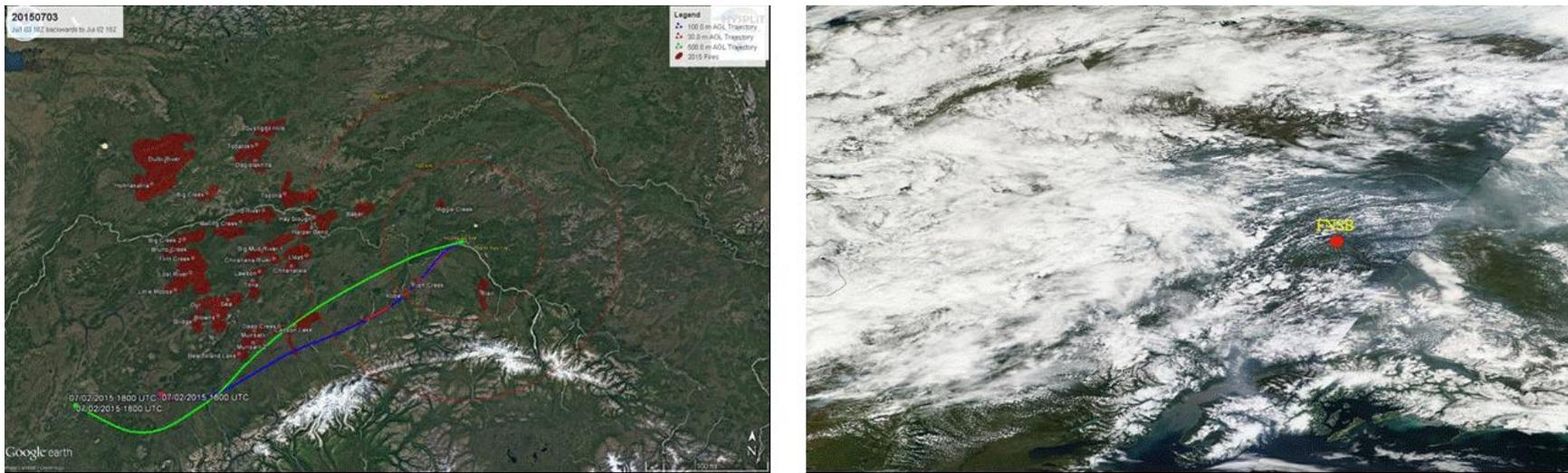


Figure 41. Google Earth with 2015 Fire Perimeters and 03/18Z Hysplit 30m/100m/500m back trajectory. July 3, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 3, 2015 shows the 30m and 500m trajectory passing directly through the western fire complex's smoke field that is trapped below the central interior cloud layers. A mixture of clouds and smoke are visible on the imagery throughout the interior of Alaska.

Table 24. Hourly observation for Fairbanks International Airport, July 3, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/03/2015 00:53 AKDT	5	220	**	**	10	55	46
PAFA	07/03/2015 01:53 AKDT	7	190	**	**	10	51	45
PAFA	07/03/2015 02:53 AKDT	3	210	**	**	10	48	45
PAFA	07/03/2015 03:53 AKDT	0	0	**	7 (Smoke)	6	47	45
PAFA	07/03/2015 04:53 AKDT	0	0	**	7 (Smoke)	5	48	45
PAFA	07/03/2015 05:53 AKDT	0	0	**	7 (Smoke)	6	48	45
PAFA	07/03/2015 06:53 AKDT	0	0	**	7 (Smoke)	3	50	46
PAFA	07/03/2015 07:53 AKDT	0	0	**	7 (Smoke)	3	54	46
PAFA	07/03/2015 08:53 AKDT	0	0	**	7 (Smoke)	3	54	45
PAFA	07/03/2015 09:53 AKDT	0	0	**	7 (Smoke)	4	57	45
PAFA	07/03/2015 10:53 AKDT	0	0	**	7 (Smoke)	4	61	44
PAFA	07/03/2015 11:53 AKDT	6	90	**	7 (Smoke)	5	63	46
PAFA	07/03/2015 12:53 AKDT	5	190	**	**	7	65	45
PAFA	07/03/2015 13:53 AKDT	0	0	**	**	7	67	44
PAFA	07/03/2015 14:53 AKDT	5	60	**	**	10	69	45
PAFA	07/03/2015 15:53 AKDT	8	120	**	**	10	70	45
PAFA	07/03/2015 16:53 AKDT	7	100	**	**	10	70	45
PAFA	07/03/2015 17:53 AKDT	6	120	**	**	10	72	45
PAFA	07/03/2015 18:53 AKDT	6	80	**	**	10	72	43
PAFA	07/03/2015 19:53 AKDT	6	100	**	**	10	70	45
PAFA	07/03/2015 20:53 AKDT	6	110	**	**	10	69	44
PAFA	07/03/2015 21:53 AKDT	5	120	**	**	10	66	46
PAFA	07/03/2015 22:53 AKDT	0	0	**	**	10	63	53
PAFA	07/03/2015 23:53 AKDT	3	30	**	**	10	63	49

Surface observations: Table 21 show the morning winds were calm, due to the smoke in the atmosphere acting as a condensation nuclei, moisture attached to the particles creating a smoke and fog mixture. After the late morning inversion break, the winds increased, increasing the atmospheric mixing and increased the surface visibility to above 10 miles.

July 4, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 299 fires burning statewide. For the 2015 fire season 2,374,755 acres have been burned, and that is a 24-hr increase of 147,236 acres from the previous day.

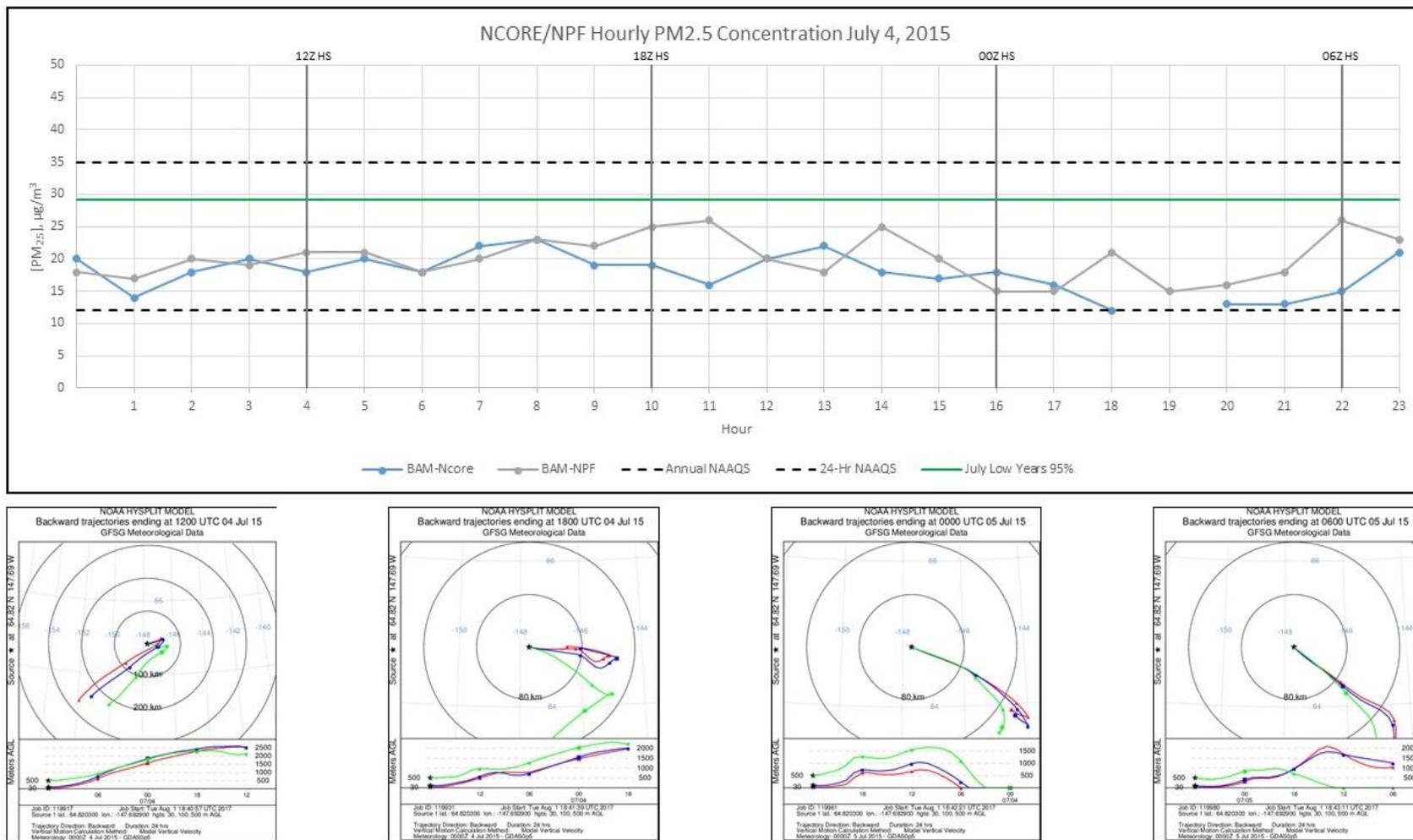


Figure 42. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 4, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 40 depicts relatively low hourly PM_{2.5}

concentration in the morning hours but then slightly increasing later in the day, July 4, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, , primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 17.9 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 20.1 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the southeast most of the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 43. The 04/12Z Hysplit run is the only indication that smoke from the western fire complex could have been advected into the area. PM_{2.5} concentrations were steady around 20 µg/m³ for July 4 2017, the change in wind direction, air parcels have very little effect on the PM_{2.5} concentration.

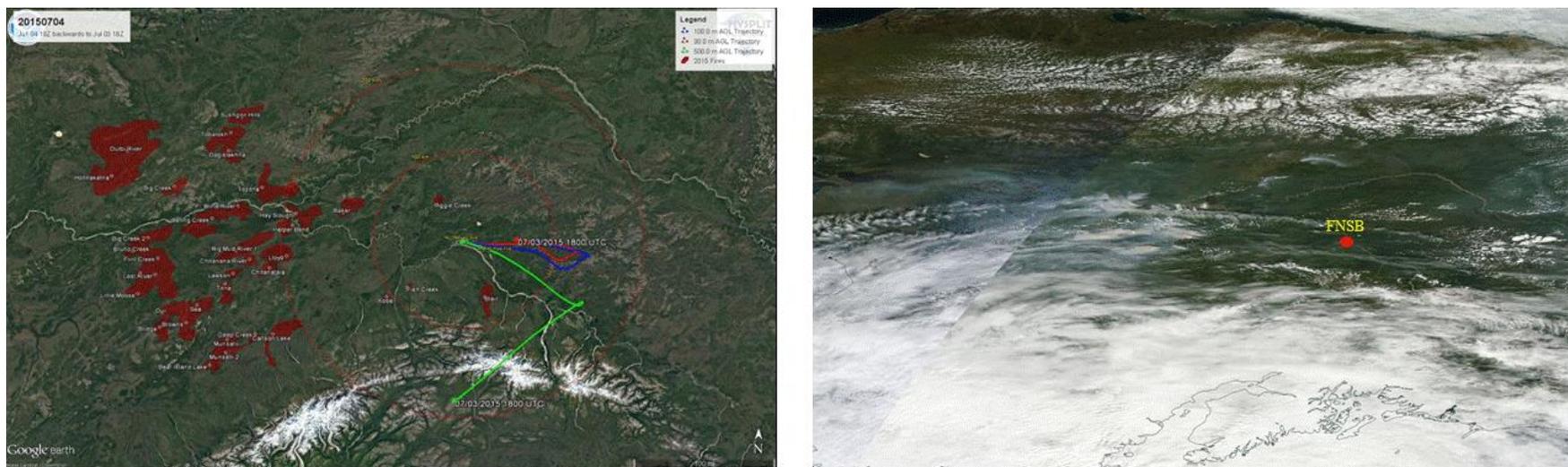


Figure 43. Google Earth with 2015 Fire Perimeters and 04/18Z Hysplit 30m/100m/500m back trajectory. July 4, 2015 MODIS satelllite imagery.

MODIS image: Imagery for July 4, 2015 shows westward movement of surface smoke due to the low level easterly wind component. Air upstream of FNSB (to the east), is relatively free of smoke resulting in more moderate PM_{2.5} readings in FNSB.

Table 25. Hourly observation for Fairbanks International Airport, July 4, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/04/2015 00:53 AKDT	3	30	**	**	10	59	48
PAFA	07/04/2015 01:53 AKDT	0	0	**	**	10	56	47
PAFA	07/04/2015 02:53 AKDT	5	50	**	**	10	55	46
PAFA	07/04/2015 03:53 AKDT	5	60	**	**	10	52	46
PAFA	07/04/2015 04:53 AKDT	0	0	**	**	10	52	46
PAFA	07/04/2015 05:53 AKDT	3	80	**	**	10	54	46
PAFA	07/04/2015 06:53 AKDT	0	0	**	**	9	57	48
PAFA	07/04/2015 07:53 AKDT	6	40	**	**	8	58	46
PAFA	07/04/2015 08:53 AKDT	5	80	**	**	9	59	46
PAFA	07/04/2015 09:53 AKDT	5	40	**	**	9	64	48
PAFA	07/04/2015 10:53 AKDT	6	90	**	**	9	70	48
PAFA	07/04/2015 11:53 AKDT	5	80	**	**	9	73	46
PAFA	07/04/2015 12:53 AKDT	6	**	**	**	9	75	45
PAFA	07/04/2015 13:53 AKDT	7	**	**	**	8	75	46
PAFA	07/04/2015 14:53 AKDT	7	80	**	**	8	77	48
PAFA	07/04/2015 15:53 AKDT	10	140	**	**	10	79	47
PAFA	07/04/2015 16:53 AKDT	10	100	**	**	10	79	43
PAFA	07/04/2015 17:53 AKDT	8	100	**	**	10	81	45
PAFA	07/04/2015 18:53 AKDT	6	140	**	**	10	79	46
PAFA	07/04/2015 19:53 AKDT	0	0	**	**	10	79	46
PAFA	07/04/2015 20:53 AKDT	0	0	**	**	10	77	50
PAFA	07/04/2015 21:53 AKDT	3	70	**	**	10	73	55
PAFA	07/04/2015 22:53 AKDT	0	0	**	**	10	72	54
PAFA	07/04/2015 23:53 AKDT	3	250	**	**	10	69	50

Surface observations: Table 22 show winds out of the east for most of the day. Visibility dropped slightly during the late morning hours to early afternoon. Due to the temperature and dew point spread I would say it was just Haze do to the PM_{2.5} parties in the air.

July 5, 2015

AICC Report Fire Information: There were 5 new fires reported for a total of 300 fires burning statewide. For the 2015 fire season 2,581,508 acres have been burned, and that is a 24-hr increase of 206,753 acres from the previous day.

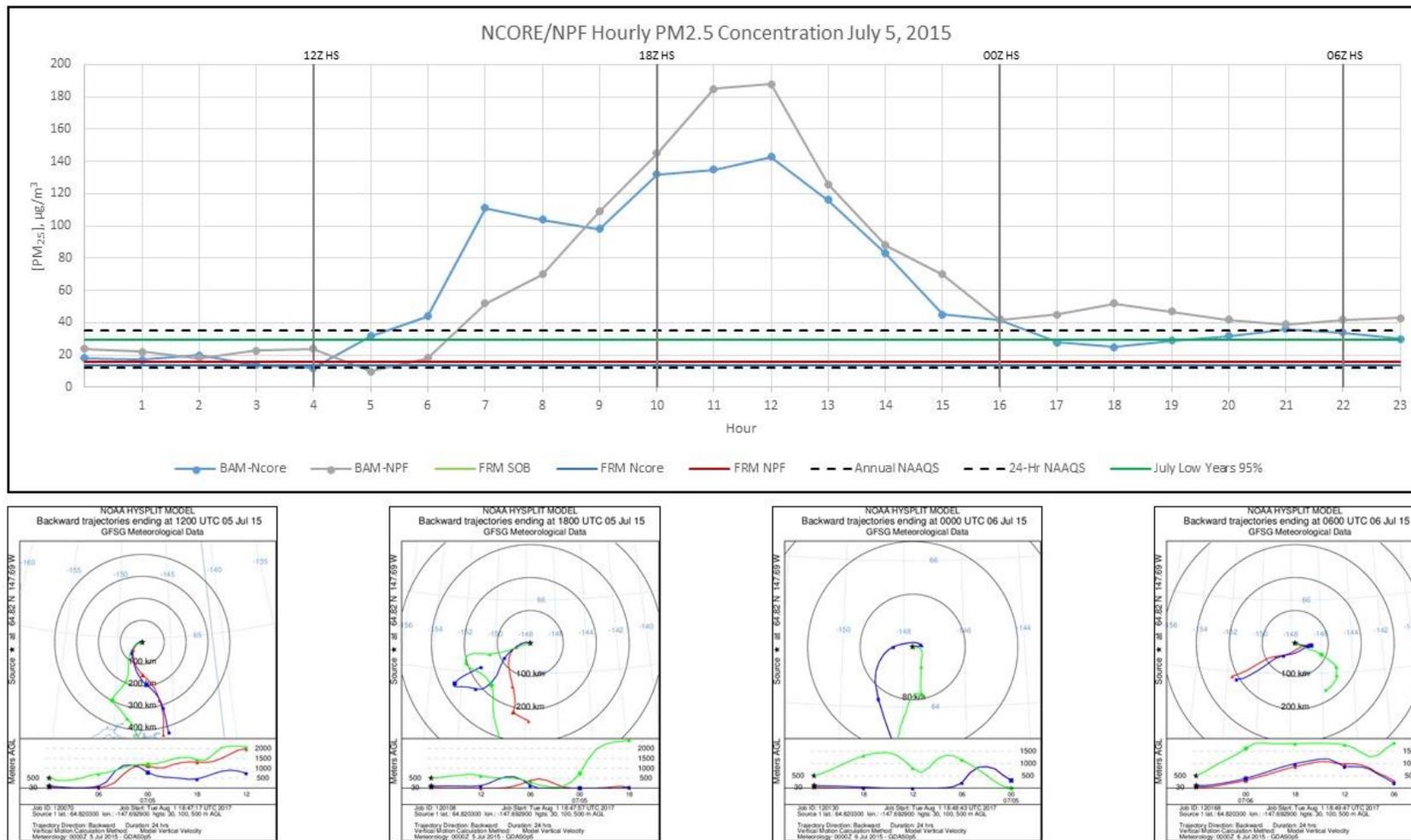


Figure 44. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 5, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 44 depicts moderate hourly PM_{2.5}

concentrations, near $190 \mu\text{g}/\text{m}^3$ mid-day, 5 July, 2015. The SOB 24-hour FRM $\text{PM}_{2.5}$ concentration was $14.0 \mu\text{g}/\text{m}^3$, NCORE BAM $\text{PM}_{2.5}$ 24-hour concentration was $13.8 \mu\text{g}/\text{m}^3$, NCORE 24-hour FRM $\text{PM}_{2.5}$ concentration was $15.5 \mu\text{g}/\text{m}^3$, NPF continuous BAM $\text{PM}_{2.5}$ 24-hour average concentration was $57.5 \mu\text{g}/\text{m}^3$ and NPF 24-hour FRM $\text{PM}_{2.5}$ concentration was $63.5 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from south southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 45. The fires to the west continued to produce moderate smoke and elevated $\text{PM}_{2.5}$ concentrations are a result of the smoke being advected into FNSB.

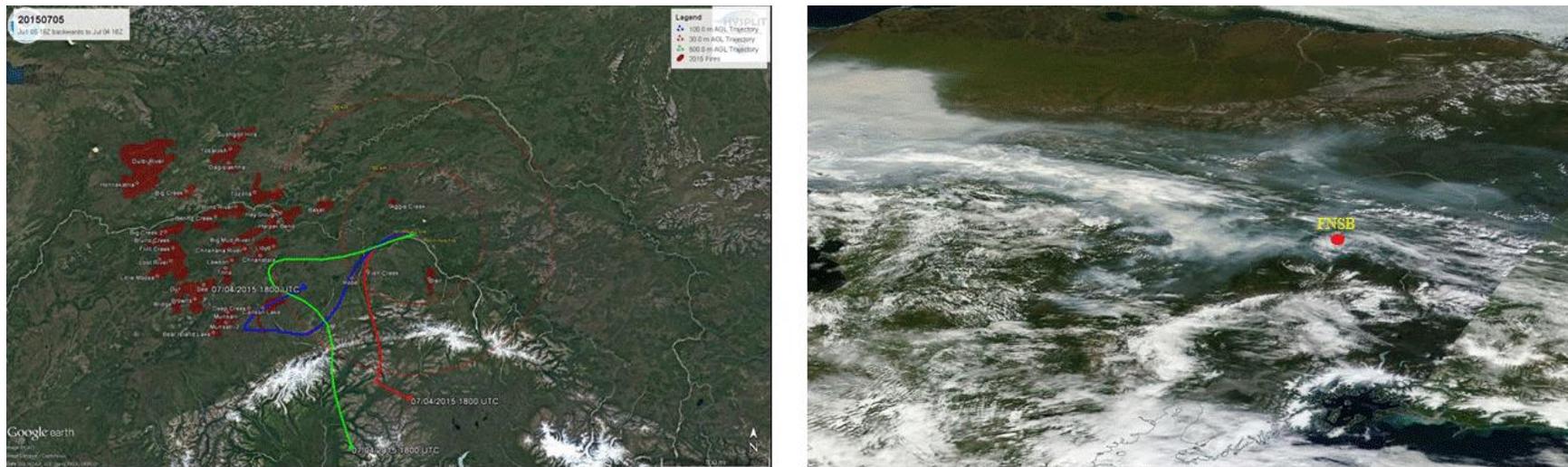


Figure 45. Google Earth with 2015 Fire Perimeters and 05/18Z Hysplit 30m/100m/500m back trajectory. July 5, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 5, 2015 shows the smoke plume to the west of FNSB the 18Z Hysplit 30/100/500m trajectory pass directly through the smoke plume to the west of FNSB.

Table 26. Hourly observation for Fairbanks International Airport, July 5, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFA	07/05/2015 00:53 AKDT	0	0	**	**	10	65	52
PAFA	07/05/2015 01:53 AKDT	0	0	**	**	10	64	56
PAFA	07/05/2015 02:53 AKDT	0	0	**	**	10	64	48
PAFA	07/05/2015 03:53 AKDT	3	**	**	**	10	67	49
PAFA	07/05/2015 04:53 AKDT	7	260	**	**	10	68	45
PAFA	07/05/2015 05:53 AKDT	0	0	**	**	10	68	45
PAFA	07/05/2015 06:53 AKDT	7	240	**	**	8	66	46
PAFA	07/05/2015 07:53 AKDT	8	240	**	7 (Smoke)	2	64	46
PAFA	07/05/2015 08:53 AKDT	9	250	**	7 (Smoke)	3	64	48
PAFA	07/05/2015 09:53 AKDT	3	230	**	7 (Smoke)	3	64	49
PAFA	07/05/2015 10:53 AKDT	0	0	**	7 (Smoke)	2	64	50
PAFA	07/05/2015 11:53 AKDT	0	0	**	7 (Smoke)	2	66	52
PAFA	07/05/2015 12:53 AKDT	0	0	**	7 (Smoke)	2	72	52
PAFA	07/05/2015 13:53 AKDT	6	150	**	7 (Smoke)	2	70	52
PAFA	07/05/2015 14:53 AKDT	0	0	**	7 (Smoke)	2	73	52
PAFA	07/05/2015 15:53 AKDT	0	0	**	7 (Smoke)	3	73	48
PAFA	07/05/2015 16:53 AKDT	5	110	**	7 (Smoke)	4	77	48
PAFA	07/05/2015 17:53 AKDT	3	**	**	7 (Smoke)	6	78	47
PAFA	07/05/2015 18:53 AKDT	5	80	**	7 (Smoke)	6	79	46
PAFA	07/05/2015 19:53 AKDT	3	120	**	7 (Smoke)	6	79	48
PAFA	07/05/2015 20:53 AKDT	3	90	**	7 (Smoke)	6	79	48
PAFA	07/05/2015 21:53 AKDT	3	80	**	7 (Smoke)	6	75	52
PAFA	07/05/2015 22:53 AKDT	3	350	**	7 (Smoke)	6	73	52
PAFA	07/05/2015 23:53 AKDT	3	360	**	7 (Smoke)	6	68	53

Surface observations: Table 23 show the morning winds were out of the west early morning, visibility dropped rapidly as the smoke advected into the airport. The visibility increased gradually as the winds began to shift to a more southeasterly component late in the evening. The lowest visibility report is two miles which equated to the “Unhealthy” category on the Air Quality Index chart.

July 6, 2015

AICC Report Fire Information: There were 5 new fires reported for a total of 303 fires burning statewide. For the 2015 fire season 2,950,572 acres have been burned, and that is a 24-hr increase of 369,064 acres from the previous day.

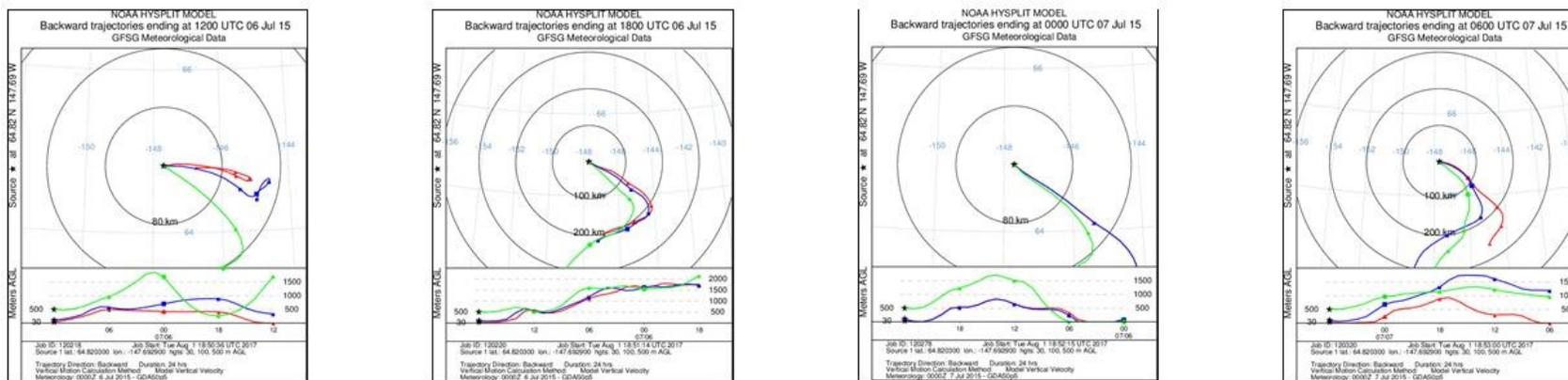
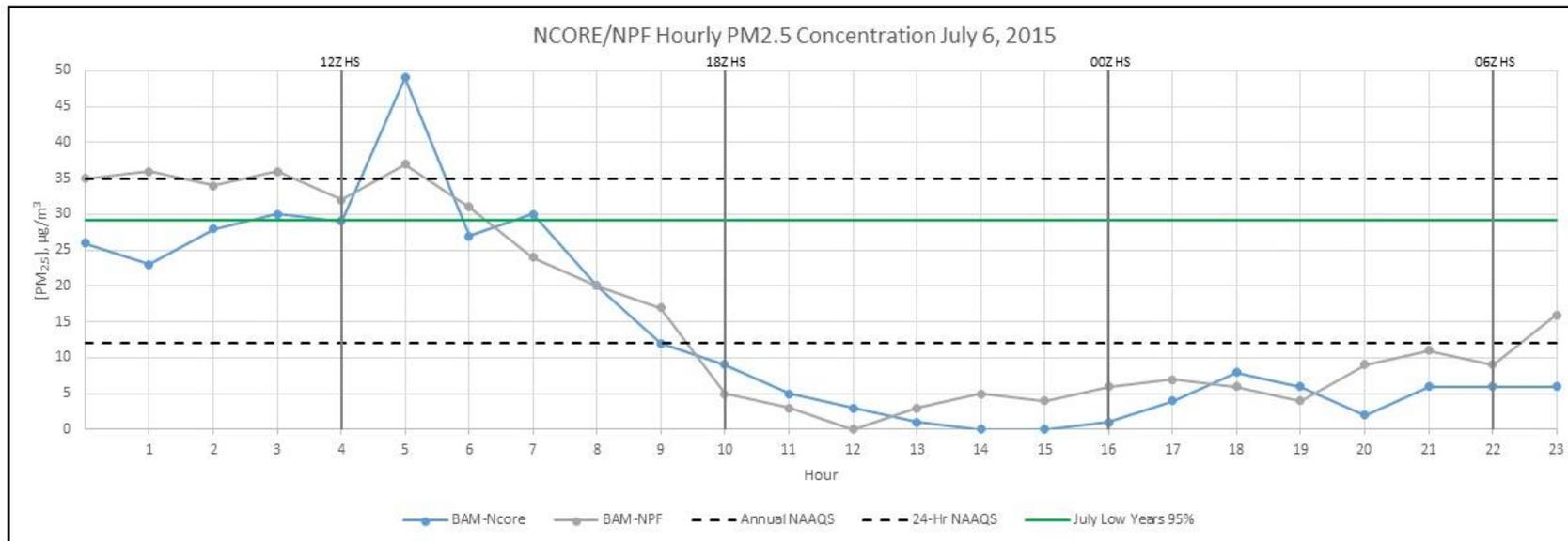


Figure 46. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 6, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 46 depicts higher hourly PM_{2.5}

concentration in the morning hours but then decreasing later in the day, July 6, 2015 as the clean air from the southeast advected into FNSB. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM $PM_{2.5}$ 24-hour concentration was $13.8 \mu\text{g}/\text{m}^3$, and NPF continuous BAM $PM_{2.5}$ 24-hour average concentration was $16.3 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the southeast throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 47. Clean air from the southwest cleaned out the early morning high $PM_{2.5}$ concentrations for July 6, 2015.

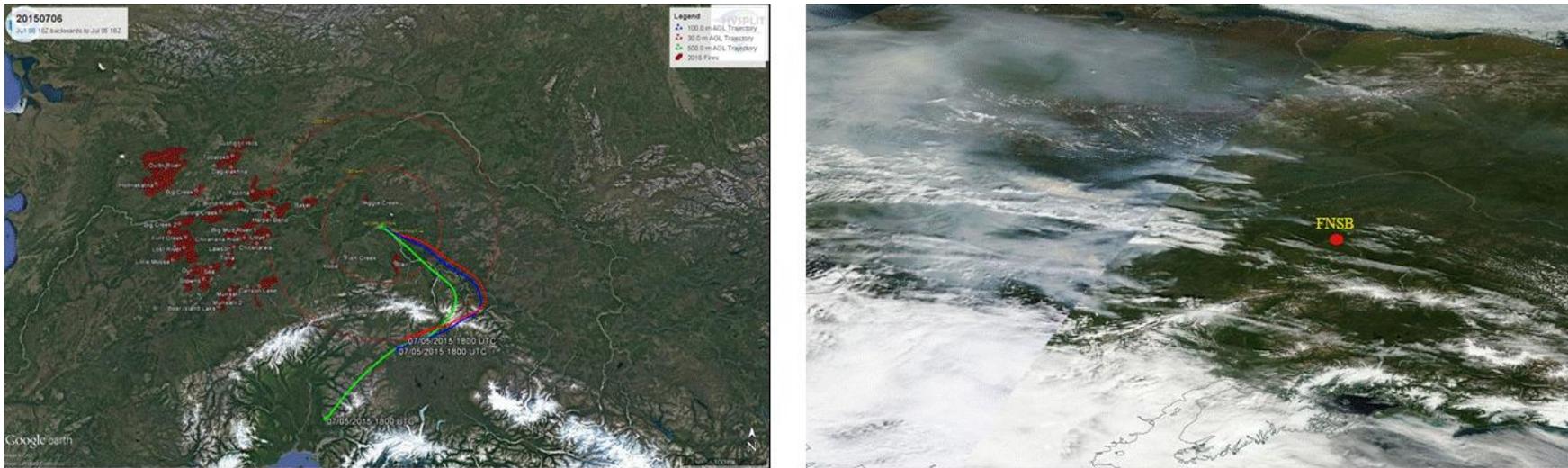


Figure 47. Google Earth with 2015 Fire Perimeters and 06/18Z Hysplit 30m/100m/500m back trajectory. July 6, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 6, 2015 shows the 30m and 500m trajectory originating in clean air to the southwest. The smoke from the western fire complex is being transported to the west, away from FNSB.

Table 27. Hourly observation for Fairbanks International Airport, July 6, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/06/2015 00:53 AKDT	0	0	**	**	8	64	50
PAFA	07/06/2015 01:53 AKDT	7	40	**	**	7	60	49
PAFA	07/06/2015 02:53 AKDT	3	40	**	**	7	61	48
PAFA	07/06/2015 03:53 AKDT	0	0	**	**	7	56	50
PAFA	07/06/2015 04:53 AKDT	0	0	**	**	7	59	52
PAFA	07/06/2015 05:53 AKDT	0	0	**	**	8	61	53
PAFA	07/06/2015 06:53 AKDT	5	50	**	**	8	64	52
PAFA	07/06/2015 07:53 AKDT	7	60	**	**	8	66	52
PAFA	07/06/2015 08:53 AKDT	5	80	**	**	10	72	52
PAFA	07/06/2015 09:53 AKDT	7	100	**	**	10	76	52
PAFA	07/06/2015 10:53 AKDT	10	90	**	**	10	79	52
PAFA	07/06/2015 11:53 AKDT	7	90	**	**	10	81	54
PAFA	07/06/2015 12:53 AKDT	9	90	**	**	10	82	52
PAFA	07/06/2015 13:53 AKDT	13	70	18	**	10	84	52
PAFA	07/06/2015 14:53 AKDT	9	120	**	**	10	87	51
PAFA	07/06/2015 15:53 AKDT	6	140	**	**	10	86	50
PAFA	07/06/2015 16:53 AKDT	5	130	**	**	10	88	52
PAFA	07/06/2015 17:53 AKDT	9	160	**	**	10	90	52
PAFA	07/06/2015 18:53 AKDT	7	130	**	**	10	88	52
PAFA	07/06/2015 19:53 AKDT	5	100	**	**	10	88	54
PAFA	07/06/2015 20:53 AKDT	5	110	**	**	10	86	56
PAFA	07/06/2015 21:53 AKDT	3	80	**	**	10	84	57
PAFA	07/06/2015 22:53 AKDT	0	0	**	**	10	79	61
PAFA	07/06/2015 23:53 AKDT	0	0	**	**	10	76	58

Surface observations: Table 24 show the morning winds light and variable with a slight visibility drop due to smoke (reflected in Figure 46, 0000-0900L). After the morning winds increased from the east southeast, the visibility became unrestricted.

July 7, 2015

AICC Report Fire Information: There were 8 new fires reported for a total of 312 fires burning statewide. For the 2015 fire season 3,078,042 acres have been burned, and that is a 24-hr increase of 157,322 acres from the previous day.

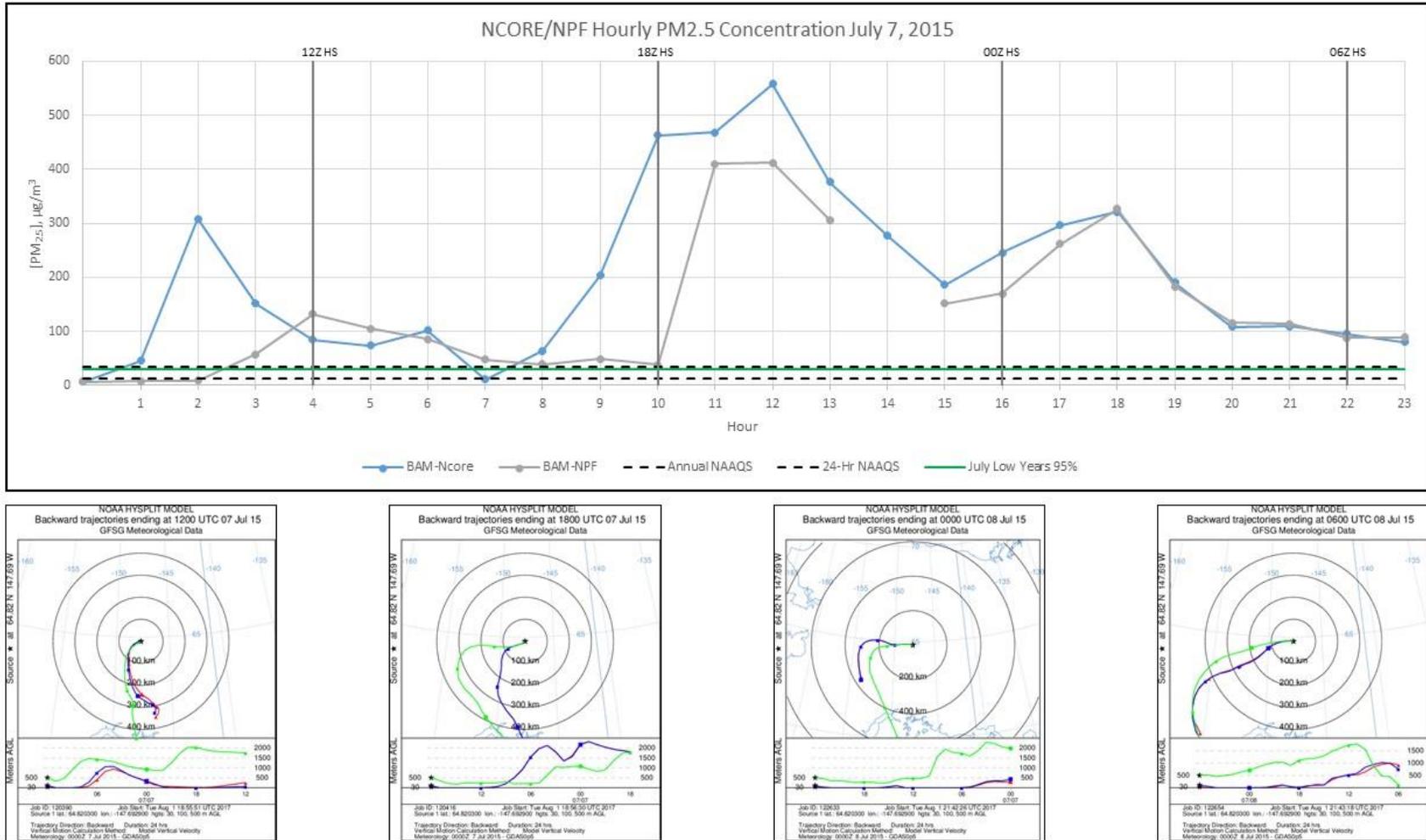


Figure 48. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 7, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 48 depicts an increase in PM_{2.5}

concentration during the early morning hours then then greatly increasing late morning to early afternoon on July 7, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 201.3 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 139.5 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 49. As the cold front stretched over central Alaska, it trapped smoke under the clouds and pushed much of the smoke back over FNSB.

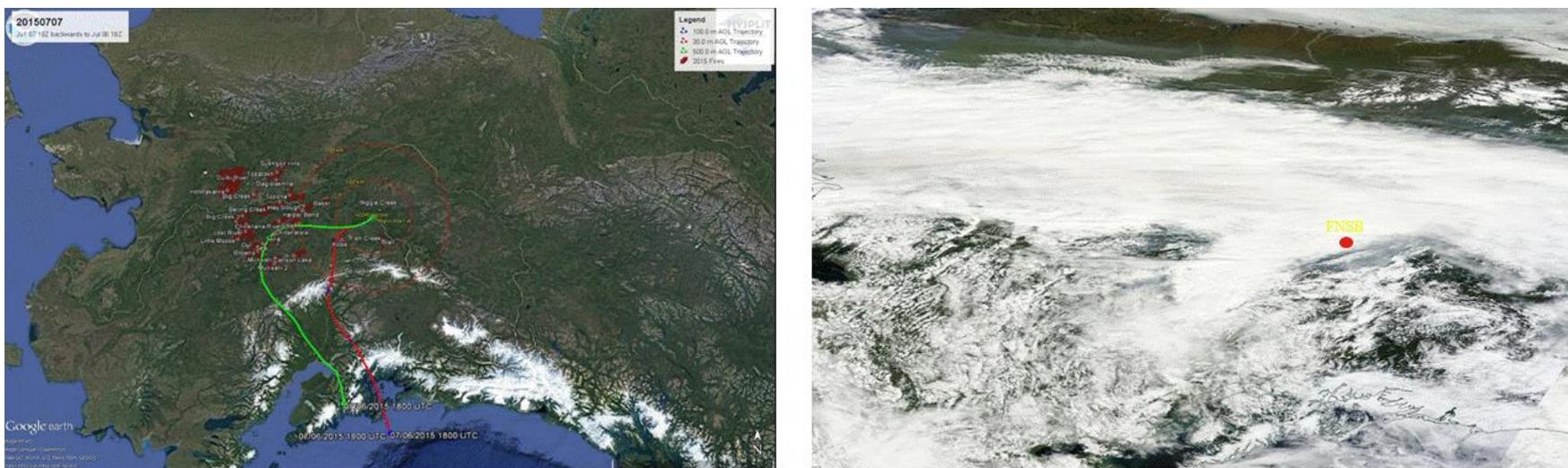


Figure 49. Google Earth with 2015 Fire Perimeters and 07/18Z Hysplit 30m/100m/500m back trajectory. July 7, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 7, 2015 shows the 30m trajectory passing directly through clouds and smoke to the west of FNSB. As the front stretched over central Alaska, it trapped the smoke under the clouds and pushed much of the smoke back over FNSB.

Table 28. Hourly observation for Fairbanks International Airport, July 7, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/07/2015 00:53 AKDT	6	240	**	**	10	77	54
PAFA	07/07/2015 01:53 AKDT	9	250	**	**	10	77	48
PAFA	07/07/2015 02:53 AKDT	8	270	**	7 (Smoke)	1	75	48
PAFA	07/07/2015 03:53 AKDT	8	270	**	7 (Smoke)	1	74	49
PAFA	07/07/2015 04:53 AKDT	5	260	**	7 (Smoke)	1	72	52
PAFA	07/07/2015 05:53 AKDT	9	290	**	7 (Smoke)	5	70	50
PAFA	07/07/2015 06:53 AKDT	0	0	**	7 (Smoke)	4	70	54
PAFA	07/07/2015 07:53 AKDT	3	250	**	**	10	70	52
PAFA	07/07/2015 08:53 AKDT	10	140	**	**	10	66	55
PAFA	07/07/2015 09:53 AKDT	7	190	**	7 (Smoke)	2	66	54
PAFA	07/07/2015 10:53 AKDT	8	240	**	7 (Smoke)	1	68	52
PAFA	07/07/2015 11:53 AKDT	14	260	**	7 (Smoke)	1	68	50
PAFA	07/07/2015 12:53 AKDT	10	290	**	7 (Smoke)	1	66	48
PAFA	07/07/2015 13:53 AKDT	10	310	**	7 (Smoke)	1	64	50
PAFA	07/07/2015 14:53 AKDT	5	270	**	7 (Smoke)	1	65	50
PAFA	07/07/2015 15:53 AKDT	10	270	**	7 (Smoke)	2	64	52
PAFA	07/07/2015 16:53 AKDT	3	270	**	7 (Smoke)	1	64	52
PAFA	07/07/2015 17:53 AKDT	8	260	**	7 (Smoke)	1	66	54
PAFA	07/07/2015 18:53 AKDT	8	260	**	7 (Smoke)	1	66	55
PAFA	07/07/2015 19:53 AKDT	14	270	18	7 (Smoke)	1	66	54
PAFA	07/07/2015 20:53 AKDT	10	240	**	7 (Smoke)	3	62	53
PAFA	07/07/2015 21:53 AKDT	15	250	21	7 (Smoke)	3	61	52
PAFA	07/07/2015 22:53 AKDT	12	260	**	7 (Smoke)	3	61	52
PAFA	07/07/2015 23:53 AKDT	5	230	**	7 (Smoke)	3	57	52

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility in all but four of the 24 hourly observations. The lowest visibility report is one mile which equated to the “Very Unhealthy” category on the Air Quality Index chart.

July 8, 2015

AICC Report Fire Information: There was 1 new fire reported for a total of 301 fires burning statewide. For the 2015 fire season 3,237,958 acres have been burned, and that is a 24-hr increase of 159,916 acres from the previous day.

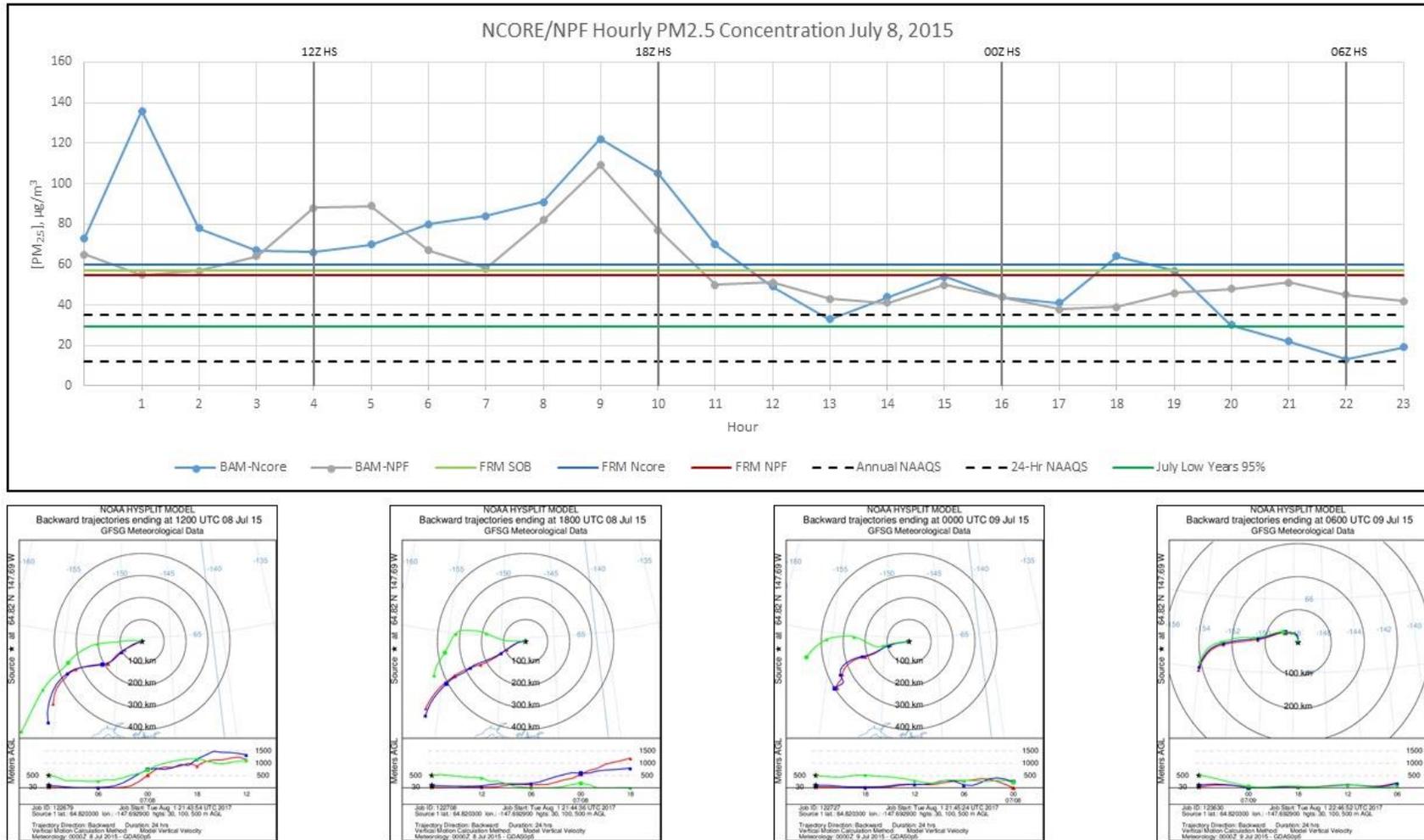


Figure 50. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 8, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 50 depicts extremely high hourly

PM_{2.5} concentration throughout the day, July 8, 2015. The SOB 24-hour FRM PM_{2.5} concentration was 57.4 µg/m³, NCORE BAM PM_{2.5} 24-hour concentration was 60.0 µg/m³, NCORE 24-hour FRM PM_{2.5} concentration was 54.5 µg/m³, NPF continuous BAM PM_{2.5} 24-hour average concentration was 63.0 µg/m³ and NPF 24-hour FRM PM_{2.5} concentration was 58.3 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 51. The front continues to stretch west to east over central Alaska acting as a barrier, keep the smoke concentrated to the south of the front.

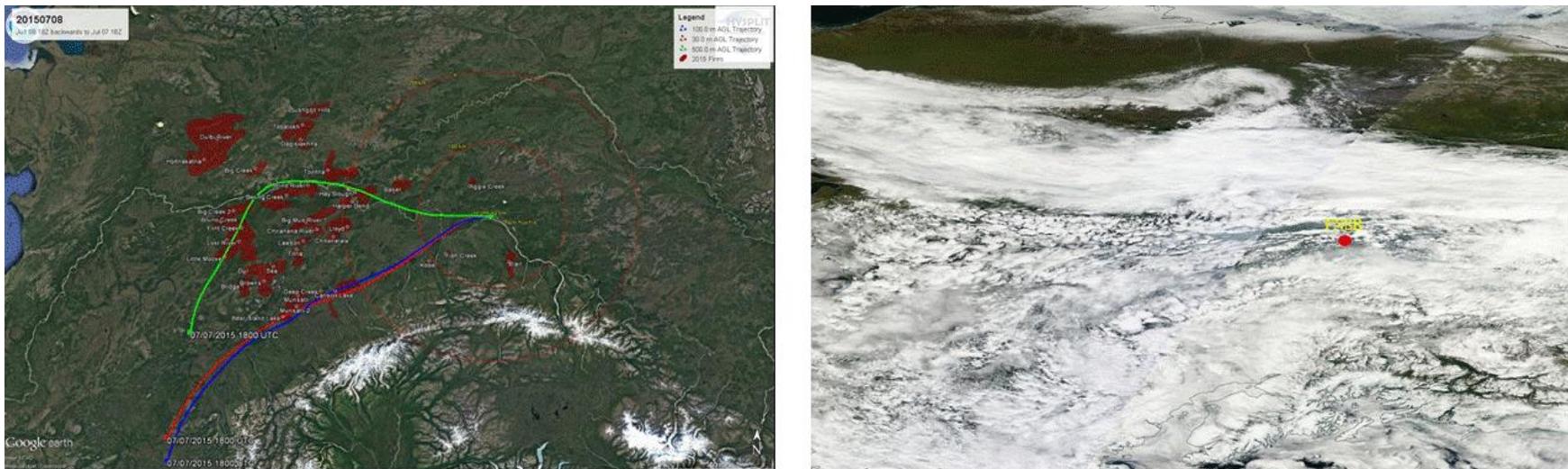


Figure 51. Google Earth with 2015 Fire Perimeters and 08/18Z Hysplit 30m/100m/500m back trajectory. July 8, 2015 MODIS satellite imagery.

MODIS image: The front continues to stretch west to east over central Alaska. The imagery for July 8, 2015 shows the 30m trajectory passing directly through the mixture of clouds and smoke to the west of FNSB.

Table 29. Hourly observation for Fairbanks International Airport, July 8, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/08/2015 00:53 AKDT	7	240	**	7 (Smoke)	3	57	54
PAFA	07/08/2015 01:53 AKDT	8	220	**	7 (Smoke)	3	57	52
PAFA	07/08/2015 02:53 AKDT	5	230	**	7 (Smoke)	3	55	52
PAFA	07/08/2015 03:53 AKDT	3	230	**	7 (Smoke)	3	55	52
PAFA	07/08/2015 04:53 AKDT	3	190	**	7 (Smoke)	2	55	50
PAFA	07/08/2015 05:53 AKDT	5	200	**	7 (Smoke)	2	55	50
PAFA	07/08/2015 06:53 AKDT	6	190	**	7 (Smoke)	2	55	52
PAFA	07/08/2015 07:53 AKDT	0	0	**	7 (Smoke)	2	57	52
PAFA	07/08/2015 08:53 AKDT	5	200	**	7 (Smoke)	2	57	52
PAFA	07/08/2015 09:53 AKDT	7	**	**	7 (Smoke)	2	63	50
PAFA	07/08/2015 10:53 AKDT	7	230	**	7 (Smoke)	2	64	51
PAFA	07/08/2015 11:53 AKDT	6	200	**	7 (Smoke)	3	65	51
PAFA	07/08/2015 12:53 AKDT	9	250	**	7 (Smoke)	6	65	49
PAFA	07/08/2015 13:53 AKDT	7	250	**	**	7	66	46
PAFA	07/08/2015 14:53 AKDT	7	230	**	**	7	70	48
PAFA	07/08/2015 15:53 AKDT	7	210	**	**	8	66	48
PAFA	07/08/2015 16:53 AKDT	5	210	**	**	8	68	48
PAFA	07/08/2015 17:53 AKDT	5	**	**	**	8	68	48
PAFA	07/08/2015 18:53 AKDT	8	290	**	7 (Smoke)	6	70	43
PAFA	07/08/2015 19:53 AKDT	8	310	**	7 (Smoke)	5	69	42
PAFA	07/08/2015 20:53 AKDT	9	340	**	7 (Smoke)	6	69	46
PAFA	07/08/2015 21:53 AKDT	7	10	**	**	9	64	47
PAFA	07/08/2015 22:53 AKDT	6	10	**	**	10	61	47
PAFA	07/08/2015 23:53 AKDT	5	10	**	**	10	59	46

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility in the majority of all 24 hourly observations. The lowest visibility report is two miles which equated to the “Unhealthy” category on the Air Quality Index chart.

July 9, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 301 fires burning statewide. For the 2015 fire season 3,510,549 acres have been burned, and that is a 24-hr increase of 272,591 acres from the previous day.

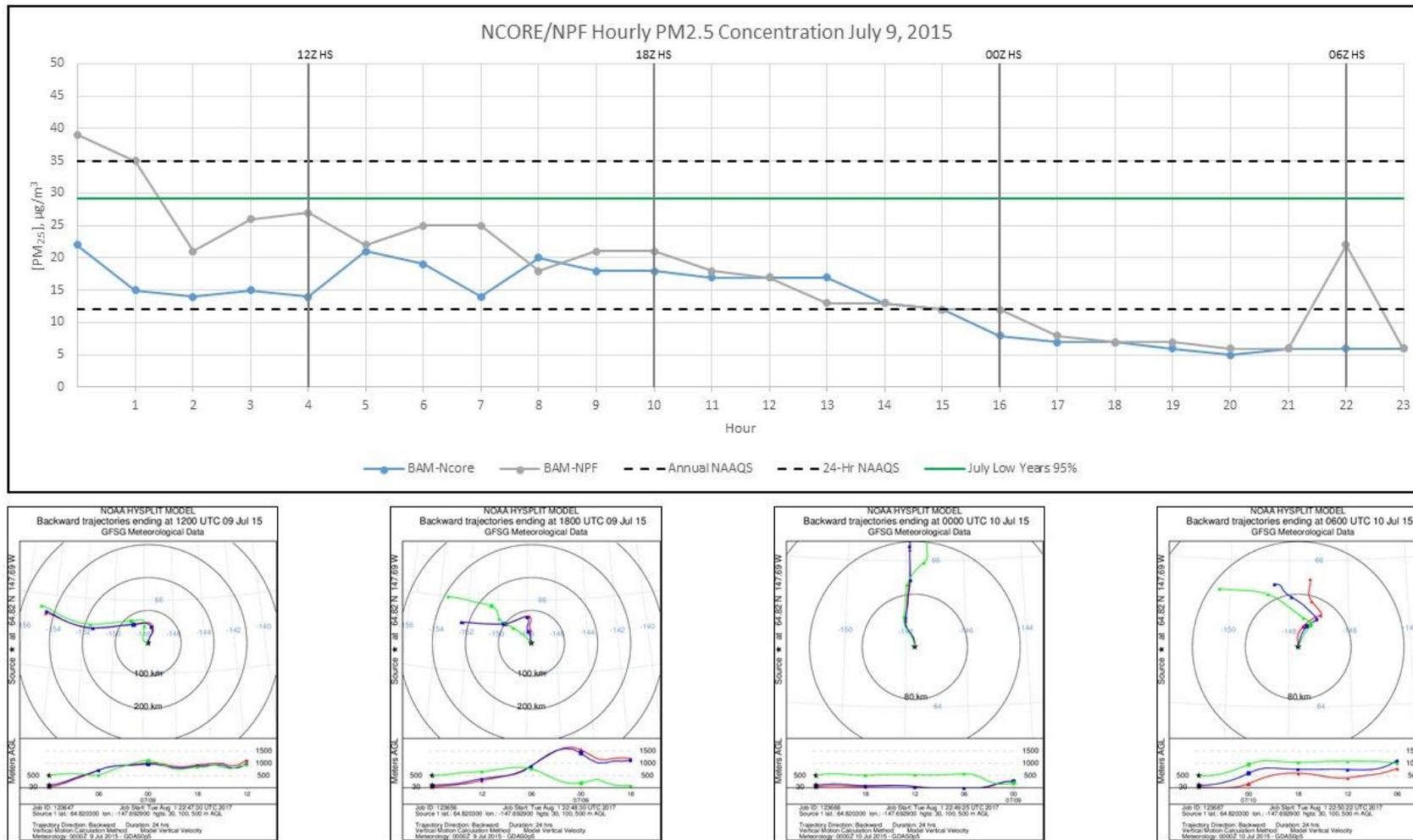


Figure 52. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 9, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 52 depicts an elevated in PM_{2.5}

concentration during the early morning hours then then decreasing throughout the day as the frontal system push through FNSB on July 9, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, , primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM $PM_{2.5}$ 24-hour concentration was $13.2 \mu\text{g}/\text{m}^3$, and NPF continuous BAM $PM_{2.5}$ 24-hour average concentration was $17.8 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west before frontal passage and then from the north after frontal passage. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 53. $PM_{2.5}$ concentrations were still relatively high in the early morning hours but as the front approached $PM_{2.5}$ concentrations declined as the winds shifted and the smoke was push out of the area to the south of FNSB.

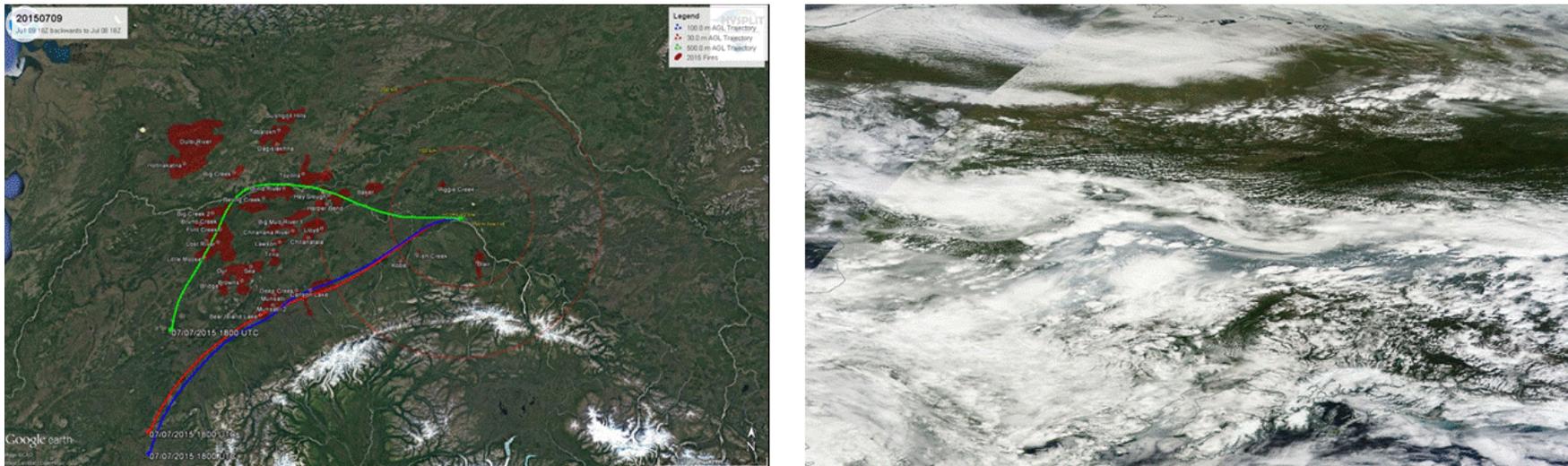


Figure 53. Google Earth with 2015 Fire Perimeters and 09/18Z Hysplit 30m/100m/500m back trajectory. July 9, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 9 2015 shows the 30m trajectory passing directly through the condensed smoke to the west of FNSB. In the afternoon hours the weak frontal boundary migrates over FNSB, winds shift, and cleaner air is advected into the area. The modis image in Figure 53 shows the weak frontal boundary directly over FNSB.

Table 30. Hourly observation for Fairbanks International Airport, July 9, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/09/2015 00:53 AKDT	8	340	**	**	10	57	45
PAFA	07/09/2015 01:53 AKDT	6	340	**	**	10	55	45
PAFA	07/09/2015 02:53 AKDT	0	0	**	**	10	52	46
PAFA	07/09/2015 03:53 AKDT	6	340	**	**	10	51	44
PAFA	07/09/2015 04:53 AKDT	8	20	**	**	10	51	45
PAFA	07/09/2015 05:53 AKDT	6	20	**	**	10	52	45
PAFA	07/09/2015 06:53 AKDT	6	40	**	**	10	53	46
PAFA	07/09/2015 07:53 AKDT	7	40	**	**	10	55	46
PAFA	07/09/2015 08:53 AKDT	6	40	**	**	10	57	48
PAFA	07/09/2015 09:53 AKDT	0	0	**	**	10	57	46
PAFA	07/09/2015 10:53 AKDT	0	0	**	**	10	61	46
PAFA	07/09/2015 11:53 AKDT	3	210	**	**	10	65	47
PAFA	07/09/2015 12:53 AKDT	6	350	**	**	10	65	48
PAFA	07/09/2015 13:53 AKDT	8	350	**	**	10	64	48
PAFA	07/09/2015 14:53 AKDT	8	360	**	**	10	64	48
PAFA	07/09/2015 15:53 AKDT	9	70	**	**	10	64	48
PAFA	07/09/2015 16:53 AKDT	9	360	**	**	10	64	48
PAFA	07/09/2015 17:53 AKDT	6	360	**	**	10	63	48
PAFA	07/09/2015 18:53 AKDT	3	40	**	**	10	64	47
PAFA	07/09/2015 19:53 AKDT	0	0	**	**	10	64	46
PAFA	07/09/2015 20:53 AKDT	3	310	**	**	10	64	46
PAFA	07/09/2015 21:53 AKDT	0	0	**	**	10	64	48
PAFA	07/09/2015 22:53 AKDT	0	0	**	**	10	63	50
PAFA	07/09/2015 23:53 AKDT	7	30	**	**	10	56	50

Surface observations: Table 27 does not have any reduction in visibility due to smoke/haze. The surface winds have a northerly component that indicates the surface trough was already in place at the start of the day.

July 10 through July 13, 2015 were not included as part of this event, the Annual NAAQS was not exceeded for those days. The smoke plume from the western fire complex was pushed to the west, as easterly winds prevailed. Winds would shift with the approaching trough on the 13th, transporting smoke back towards FNSB and increasing PM_{2.5} concentrations on July 14, 2015.

July 14, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 303 fires burning statewide. For the 2015 fire season 4,725,264 acres have been burned, and that is a 24-hr increase of 278,082 acres from the previous day.

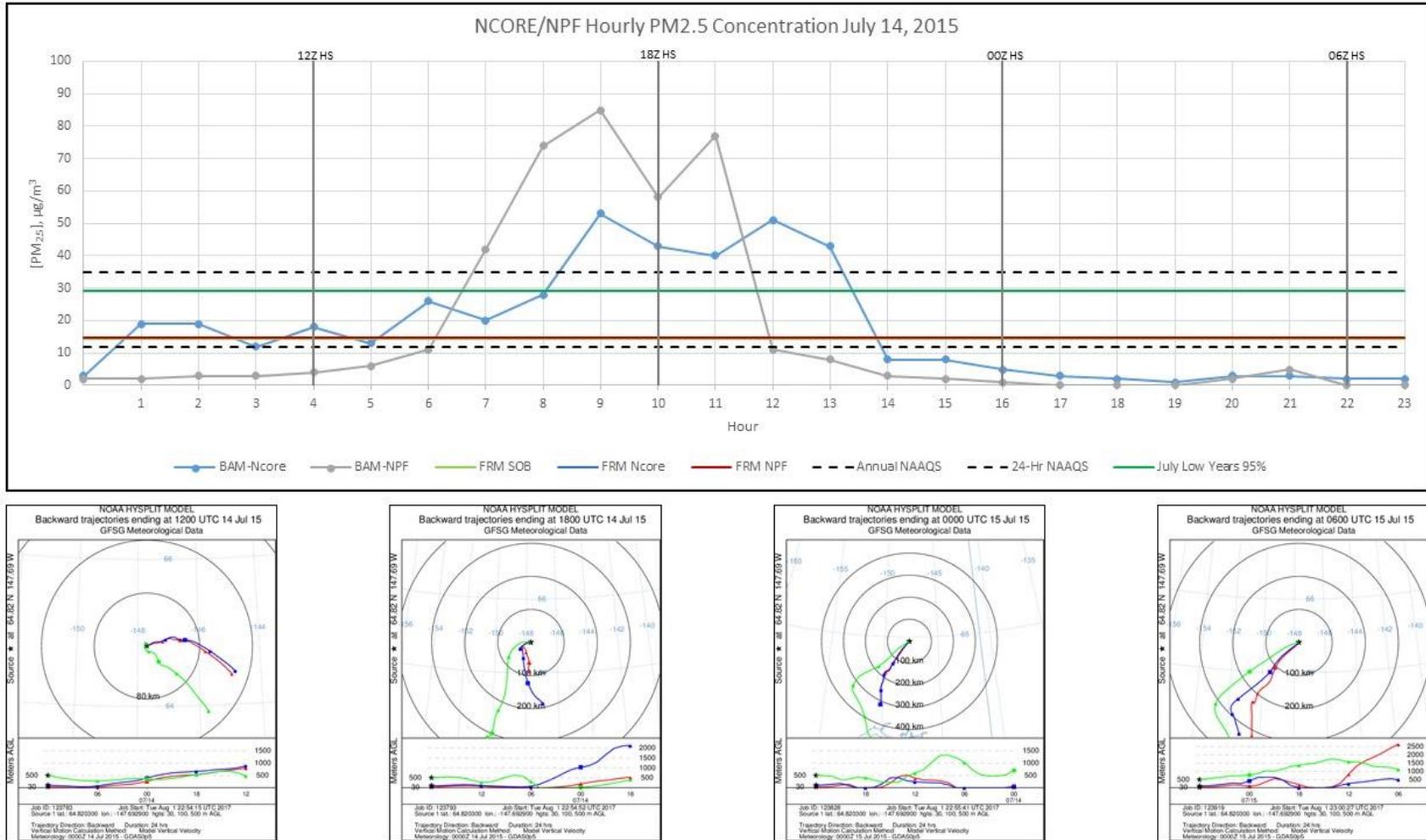


Figure 54. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 14, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 54 depicts moderate hourly PM_{2.5}

Table 31. Hourly observation for Fairbanks International Airport, July 14, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/14/2015 00:53 AKDT	5	360	**	**	10	62	53
PAFA	07/14/2015 01:53 AKDT	0	0	**	**	10	63	52
PAFA	07/14/2015 02:53 AKDT	5	150	**	**	10	59	54
PAFA	07/14/2015 03:53 AKDT	3	290	**	**	10	61	54
PAFA	07/14/2015 04:53 AKDT	3	100	**	**	10	57	54
PAFA	07/14/2015 05:53 AKDT	5	90	**	**	10	59	54
PAFA	07/14/2015 06:53 AKDT	5	40	**	**	10	57	54
PAFA	07/14/2015 07:53 AKDT	0	0	**	7 (Smoke)	5	57	55
PAFA	07/14/2015 08:53 AKDT	5	140	**	7 (Smoke)	7	57	55
PAFA	07/14/2015 09:53 AKDT	0	0	**	7 (Smoke)	5	58	56
PAFA	07/14/2015 10:53 AKDT	3	220	**	7 (Smoke)	6	59	52
PAFA	07/14/2015 11:53 AKDT	7	240	**	7 (Smoke)	6	59	52
PAFA	07/14/2015 12:53 AKDT	3	230	**	7 (Smoke)	5	59	54
PAFA	07/14/2015 13:53 AKDT	7	230	**	7 (Smoke)	5	57	52
PAFA	07/14/2015 14:53 AKDT	7	230	16	**	7	58	51
PAFA	07/14/2015 15:53 AKDT	8	230	**	**	10	58	49
PAFA	07/14/2015 16:53 AKDT	12	230	21	**	10	57	48
PAFA	07/14/2015 17:53 AKDT	9	230	**	**	10	55	48
PAFA	07/14/2015 18:53 AKDT	8	230	**	**	10	55	48
PAFA	07/14/2015 19:53 AKDT	6	250	**	**	10	55	46
PAFA	07/14/2015 20:53 AKDT	5	260	**	**	10	56	48
PAFA	07/14/2015 21:53 AKDT	5	250	**	**	10	56	48
PAFA	07/14/2015 22:53 AKDT	3	210	**	**	10	55	48
PAFA	07/14/2015 23:53 AKDT	5	170	**	**	10	55	49

Surface observations: Table 28 show minimum reduction in visibility, due to smoke, from 0800-1400L. As the winds increased in the afternoon, the visibility also increased.

July 15 through July 23, 2015 were not included as part of this event, the Annual NAAQS was not exceeded for those days. A trough passed over the western fire complex July 14th, 2015 laying down significant precipitation, dousing the fires and raining out the smoke from the atmosphere. Another round of convective activity would occur July 19th and July 20th, creating new fires on the western edge of the existing fire complex. The winds increased, advecting smoke into the FNSB area increasing PM_{2.5} concentrations July 24th, 2015.

July 24, 2015

AICC Report Fire Information: There were 6 new fires reported for a total of 290 fires burning statewide. For the 2015 fire season 4,768,762 acres have been burned, and that is a 24-hr increase of 8,628 acres from the previous day.

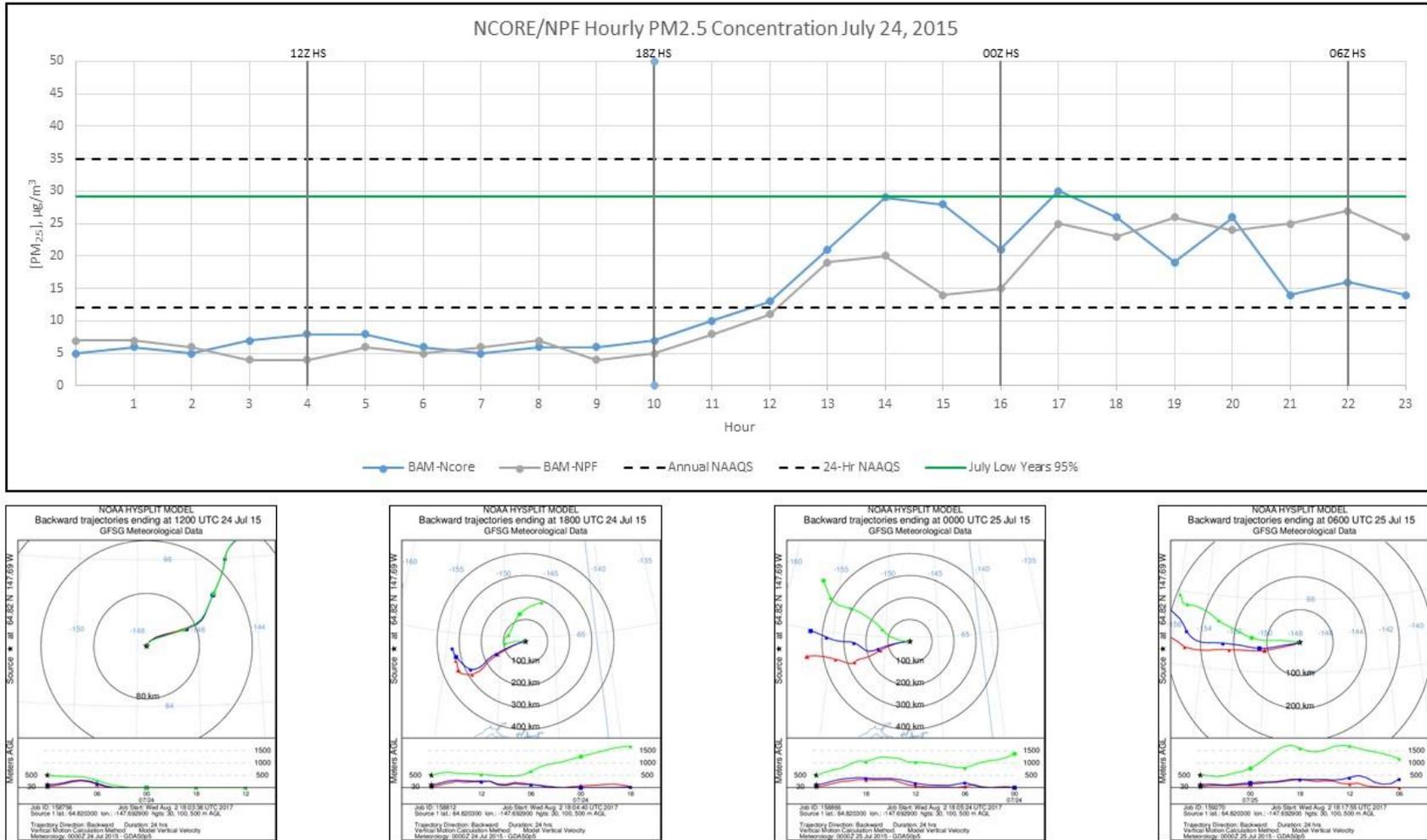


Figure 56. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 24, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 56 depicts a relatively normal PM_{2.5}

concentration during the morning hours, as the winds shifted to a more westerly component, the $PM_{2.5}$ $\mu g/m^3$ concentration rose to $30 \mu g/m^3$ on July 24, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, , primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM $PM_{2.5}$ 24-hour concentration was $14.0 \mu g/m^3$, and NPF continuous BAM $PM_{2.5}$ 24-hour average concentration was $13.4 \mu g/m^3$.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the northeast early morning and then transitioning to a more southwesterly flow, directly from the western fires. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 57.

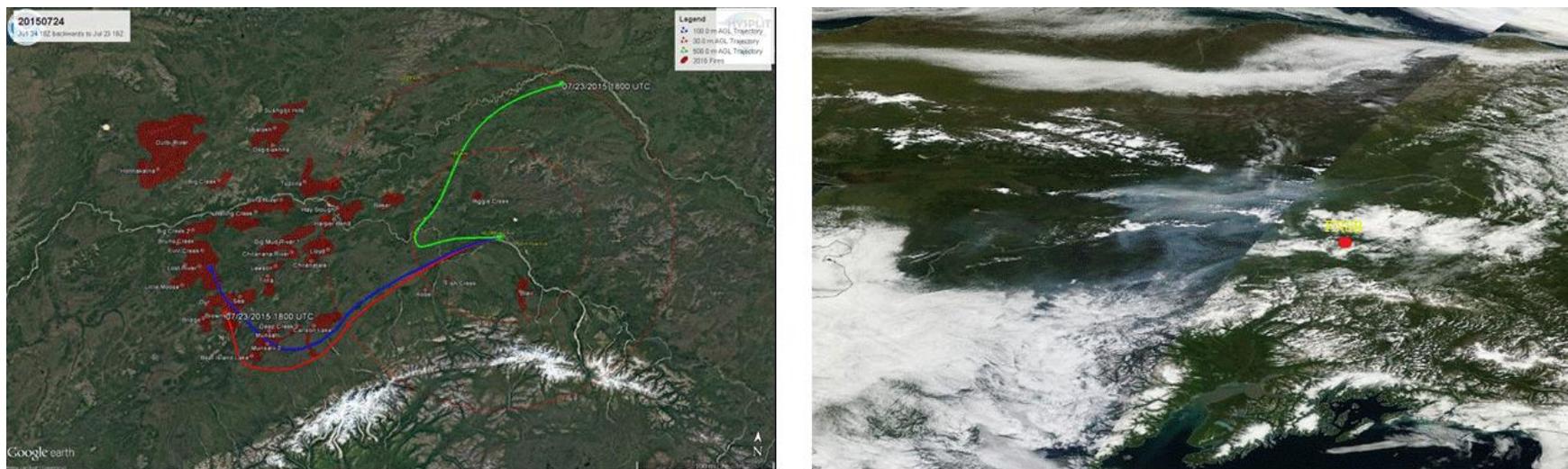


Figure 57. Google Earth with 2015 Fire Perimeters and 24/18Z Hysplit 30m/100m/500m back trajectory. July 24, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 24, 2015 shows the 30m trajectory passing through a small smoke field to the west of Fairbanks. The $PM_{2.5}$ concentrations climbed to near $30 \mu g/m^3$ for the day.

Table 32. Hourly observation for Fairbanks International Airport, July 24, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/24/2015 00:53 AKDT	0	0	**	**	10	61	52
PAFA	07/24/2015 01:53 AKDT	3	350	**	**	10	59	48
PAFA	07/24/2015 02:53 AKDT	0	0	**	**	10	55	50
PAFA	07/24/2015 03:53 AKDT	0	0	**	**	10	54	47
PAFA	07/24/2015 04:53 AKDT	3	70	**	**	10	52	45
PAFA	07/24/2015 05:53 AKDT	0	0	**	**	10	52	46
PAFA	07/24/2015 06:53 AKDT	0	0	**	**	10	55	46
PAFA	07/24/2015 07:53 AKDT	0	0	**	**	10	58	49
PAFA	07/24/2015 08:53 AKDT	0	0	**	**	10	61	50
PAFA	07/24/2015 09:53 AKDT	5	170	**	**	10	61	52
PAFA	07/24/2015 10:53 AKDT	5	190	**	**	10	64	53
PAFA	07/24/2015 11:53 AKDT	0	0	**	**	10	64	54
PAFA	07/24/2015 12:53 AKDT	0	0	**	**	10	66	54
PAFA	07/24/2015 13:53 AKDT	0	0	**	**	10	69	54
PAFA	07/24/2015 14:53 AKDT	8	240	**	**	10	72	54
PAFA	07/24/2015 15:53 AKDT	7	230	**	**	10	73	54
PAFA	07/24/2015 16:53 AKDT	6	240	**	**	9	75	54
PAFA	07/24/2015 17:53 AKDT	5	240	**	**	9	75	52
PAFA	07/24/2015 18:53 AKDT	6	260	**	**	9	77	52
PAFA	07/24/2015 19:53 AKDT	8	240	**	**	10	75	54
PAFA	07/24/2015 20:53 AKDT	5	220	**	**	9	73	54
PAFA	07/24/2015 21:53 AKDT	3	250	**	**	10	72	54
PAFA	07/24/2015 22:53 AKDT	3	180	**	**	10	68	55
PAFA	07/24/2015 23:53 AKDT	7	200	**	**	10	65	55

Surface observations: Table 29 show the morning winds were light and variable, early afternoon the winds shifted to a westerly flow. The smoke concentration to the west was not as thick so as the smoke started advecting into the area visibility at Fairbanks International only dropped to 9 miles.

July 25, 2015

AICC Report Fire Information: There were 7 new fires reported for a total of 292 fires burning statewide. For the 2015 fire season 4,762,769 acres have been burned, and that is a 24-hr increase of 22,398 acres from the previous day.

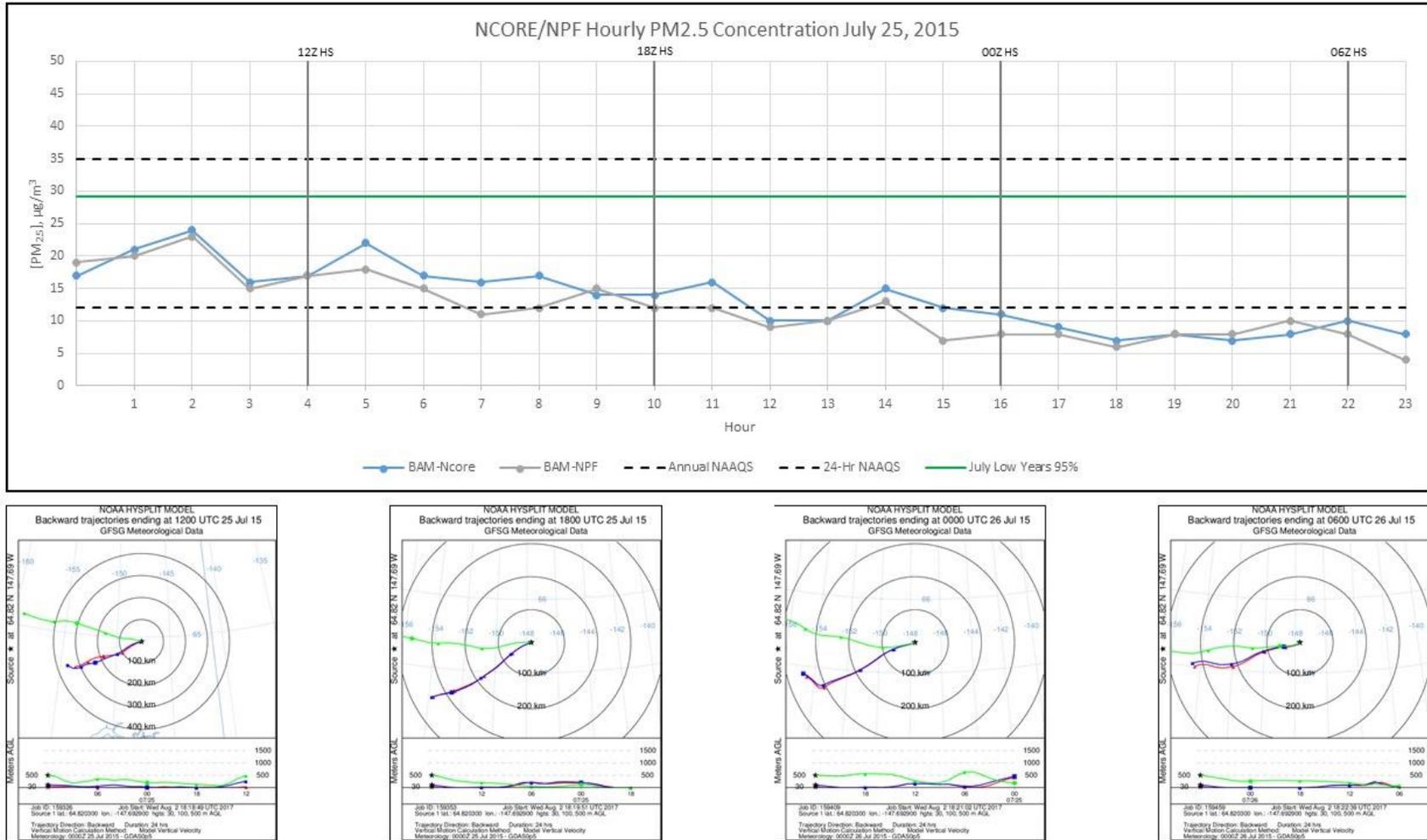


Figure 58. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 25, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 58 depicts a slightly higher than

normal PM_{2.5} concentrations throughout the day on July 25, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 13.6 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 12.0 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 59. The winds ahead of the weak trough helped disperse the smoke field from the western fire complex. As a result, recorded PM_{2.5} concentrations were slightly above normal for the day.

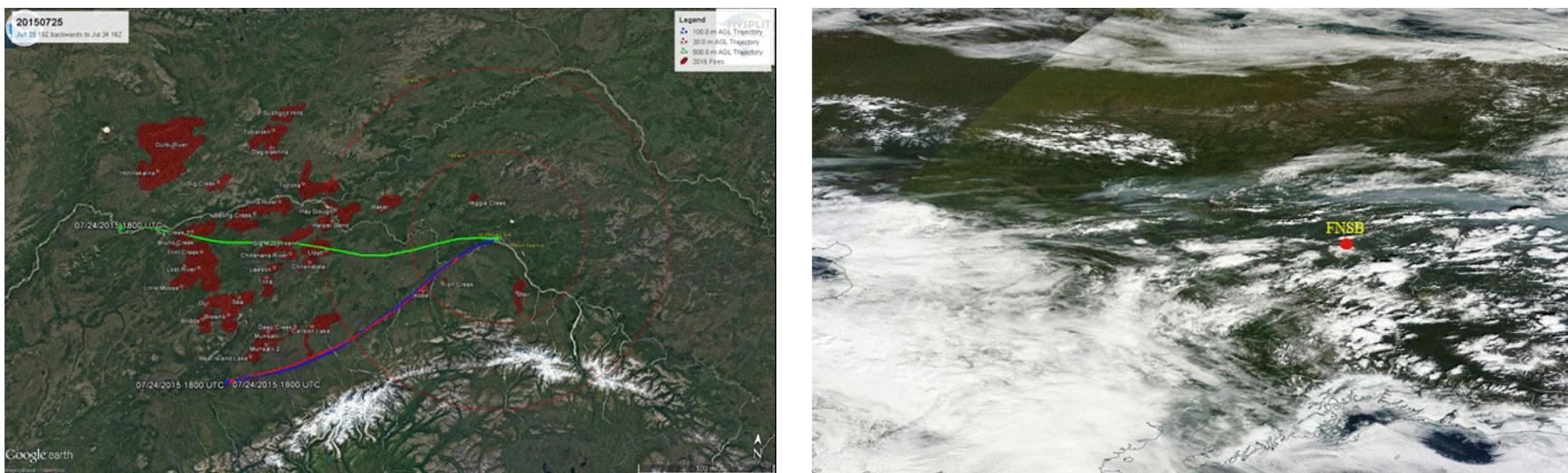


Figure 59. Google Earth with 2015 Fire Perimeters and 25/18Z Hysplit 30m/100m/500m back trajectory. July 25, 2015 MODIS satellite imagery.

MODIS image: Imagery for July 25, 2015 shows the clouds associated with the weak trough to the west southwest, the increased winds has cleared out the majority of the smoke to the west. A few fires to the northwest are still producing some heavy smoke, but the winds are transporting it to the north of FNSB.

Table 33. Hourly observation for Fairbanks International Airport, July 25, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/25/2015 00:53 AKDT	5	210	**	**	10	63	54
PAFA	07/25/2015 01:53 AKDT	6	200	**	**	10	61	54
PAFA	07/25/2015 02:53 AKDT	7	250	**	**	10	61	54
PAFA	07/25/2015 03:53 AKDT	7	220	**	**	10	63	54
PAFA	07/25/2015 04:53 AKDT	5	230	**	**	10	59	54
PAFA	07/25/2015 05:53 AKDT	3	**	**	**	10	58	53
PAFA	07/25/2015 06:53 AKDT	0	0	**	**	10	59	54
PAFA	07/25/2015 07:53 AKDT	0	0	**	**	10	61	54
PAFA	07/25/2015 08:53 AKDT	0	0	**	**	10	63	54
PAFA	07/25/2015 09:53 AKDT	5	**	**	**	10	64	55
PAFA	07/25/2015 10:53 AKDT	5	200	**	**	10	66	55
PAFA	07/25/2015 11:53 AKDT	7	**	**	**	10	68	54
PAFA	07/25/2015 12:53 AKDT	9	190	**	**	10	70	55
PAFA	07/25/2015 13:53 AKDT	6	210	**	**	10	72	55
PAFA	07/25/2015 14:53 AKDT	9	210	**	**	10	71	54
PAFA	07/25/2015 15:53 AKDT	7	210	**	**	10	72	54
PAFA	07/25/2015 16:53 AKDT	3	**	**	**	10	62	55
PAFA	07/25/2015 17:53 AKDT	3	250	**	**	10	70	54
PAFA	07/25/2015 18:53 AKDT	6	210	**	**	10	70	55
PAFA	07/25/2015 19:53 AKDT	6	240	**	**	10	72	52
PAFA	07/25/2015 20:53 AKDT	5	240	**	**	10	71	52
PAFA	07/25/2015 21:53 AKDT	6	210	**	**	10	66	54
PAFA	07/25/2015 22:53 AKDT	5	200	**	**	10	64	55
PAFA	07/25/2015 23:53 AKDT	5	160	**	**	10	63	54

Surface observations: Table 30 show the predominant winds out of the west southwest for the majority of the day. Visibility never dropped below 10 miles July 25, 2015 even though the PM_{2.5} concentrations were slightly elevated.

July 26, 2015

AICC Report Fire Information: There were 3 new fires reported for a total of 293 fires burning statewide. For the 2015 fire season 4,476,077 acres have been burned, and that is a 24-hr increase of 16,692 acres from the previous day.

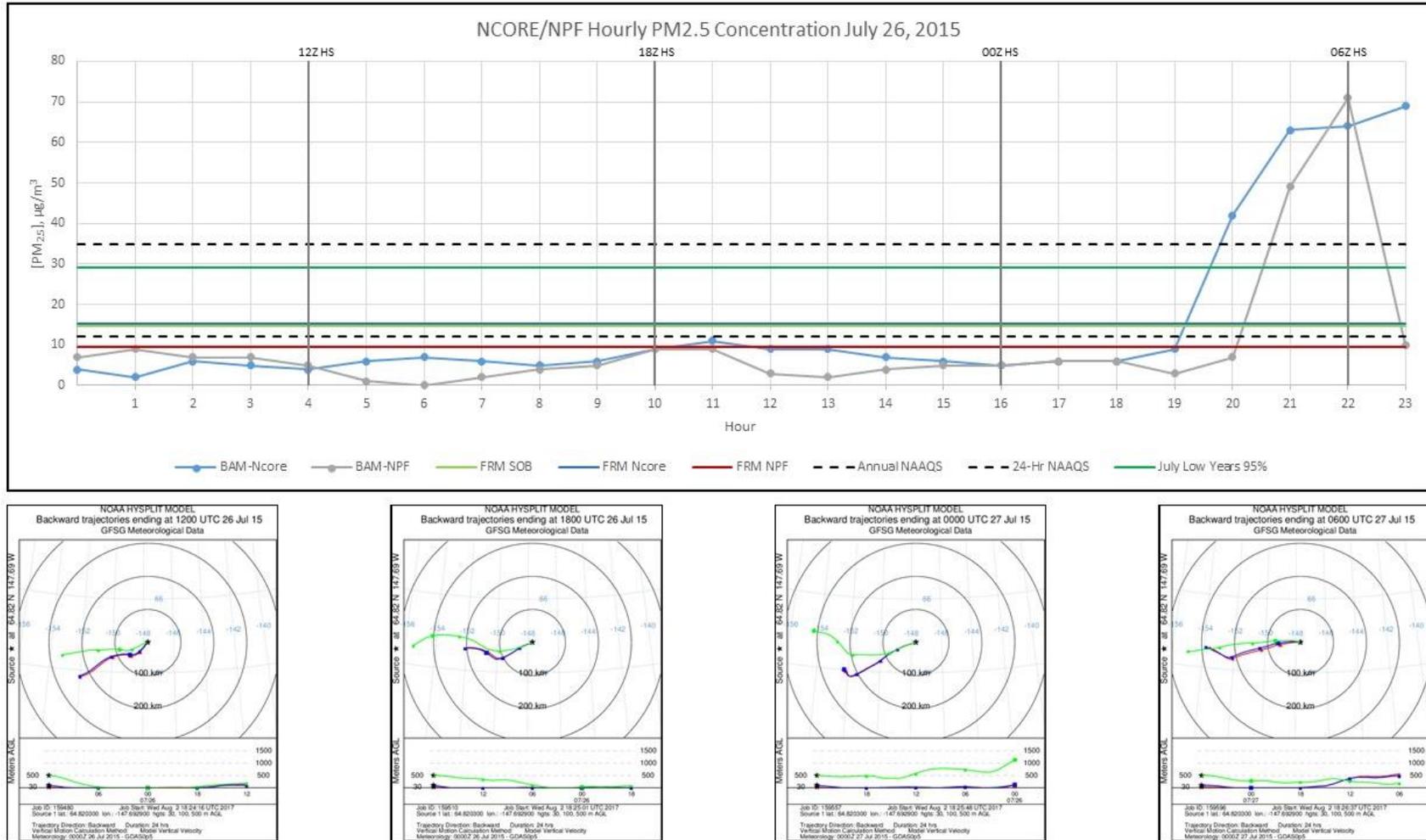


Figure 60. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 26, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 60 depicts normal summertime hourly

PM_{2.5} concentrations throughout the day until they started to climb near 80 µg/m³ late in the evening, July 26, 2015. The SOB 24-hour FRM PM_{2.5} concentration was 14.6 µg/m³, NCORE BAM PM_{2.5} 24-hour concentration was 15.3 µg/m³, NCORE 24-hour FRM PM_{2.5} concentration was 15.2 µg/m³, NPF continuous BAM PM_{2.5} 24-hour average concentration was 9.8 µg/m³ and NPF 24-hour FRM PM_{2.5} concentration was 9.6 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 61. The weak front stretched through the interior, lighter winds over the western fires allowed the smoke to accumulate and transported in to FNSB area late in the day July 26, 2015.

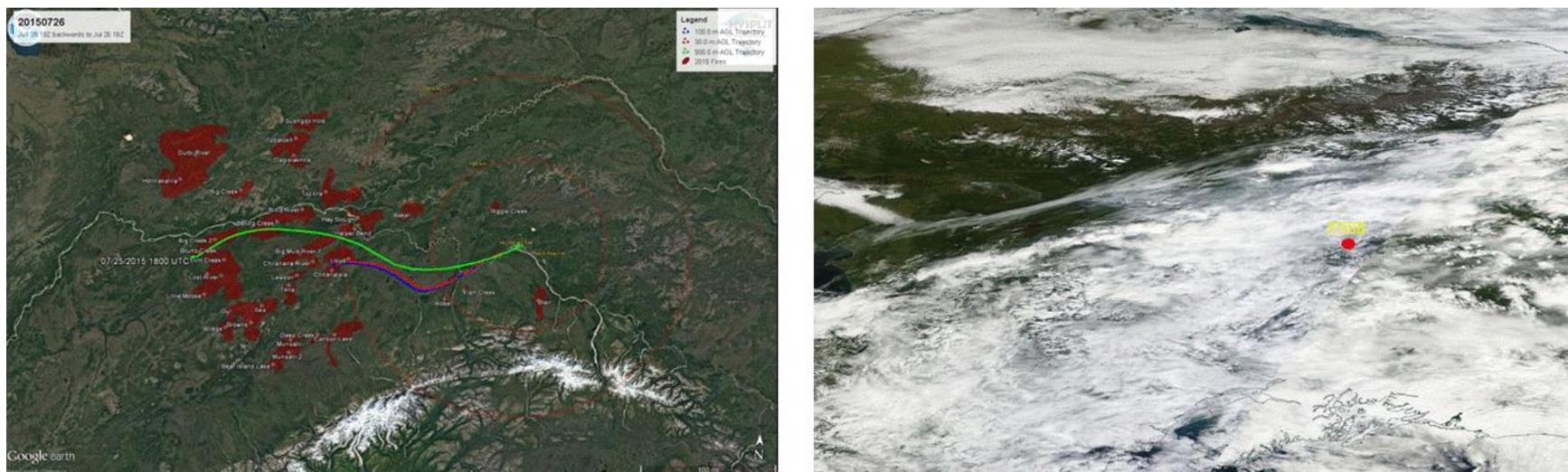


Figure 61. Google Earth with 2015 Fire Perimeters and 26/18Z Hysplit 30m/100m/500m back trajectory. July 26, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 26, 2015 shows the 30m trajectory passing directly through clouds and smoke to the west. The low clouds help keep the smoke concentrated in the low levels beneath the clouds, as the winds blew from the west, smoke was transported into FNSB.

Table 34. Hourly observation for Fairbanks International Airport, July 26, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/26/2015 00:53 AKDT	0	0	**	**	10	61	52
PAFA	07/26/2015 01:53 AKDT	6	140	**	**	10	58	51
PAFA	07/26/2015 02:53 AKDT	0	0	**	**	10	55	52
PAFA	07/26/2015 03:53 AKDT	0	0	**	**	10	54	52
PAFA	07/26/2015 04:53 AKDT	0	0	**	**	10	53	51
PAFA	07/26/2015 05:53 AKDT	0	0	**	**	10	54	52
PAFA	07/26/2015 06:53 AKDT	5	60	**	**	10	54	52
PAFA	07/26/2015 07:53 AKDT	3	40	**	**	10	54	52
PAFA	07/26/2015 08:53 AKDT	3	20	**	**	10	55	52
PAFA	07/26/2015 09:53 AKDT	3	**	**	**	10	57	52
PAFA	07/26/2015 10:53 AKDT	3	40	**	**	10	60	53
PAFA	07/26/2015 11:53 AKDT	3	**	**	**	10	63	54
PAFA	07/26/2015 12:53 AKDT	8	200	**	**	10	66	54
PAFA	07/26/2015 13:53 AKDT	6	**	**	**	10	68	52
PAFA	07/26/2015 14:53 AKDT	6	290	**	**	10	69	50
PAFA	07/26/2015 15:53 AKDT	10	270	**	**	10	70	50
PAFA	07/26/2015 16:53 AKDT	9	240	**	**	10	70	50
PAFA	07/26/2015 17:53 AKDT	10	250	**	**	10	68	50
PAFA	07/26/2015 18:53 AKDT	10	250	**	**	10	68	51
PAFA	07/26/2015 19:53 AKDT	9	250	**	**	9	66	52
PAFA	07/26/2015 20:53 AKDT	9	240	**	**	7	64	51
PAFA	07/26/2015 21:53 AKDT	8	250	**	6 (Haze)	3	61	52
PAFA	07/26/2015 22:53 AKDT	5	**	**	7 (Smoke)	3	59	51
PAFA	07/26/2015 23:53 AKDT	0	0	**	7 (Smoke)	3	59	51

Surface observations: Table 31 show the morning winds were light and variable, early afternoon the winds shifted to a westerly flow. The smoke concentration trapped below the clouds to the west advected in late in the day, reducing visibility to 3 miles.

July 27, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 292 fires burning statewide. For the 2015 fire season 4,719,957 acres have been burned, and that is a 24-hr increase of 243,880 acres from the previous day.

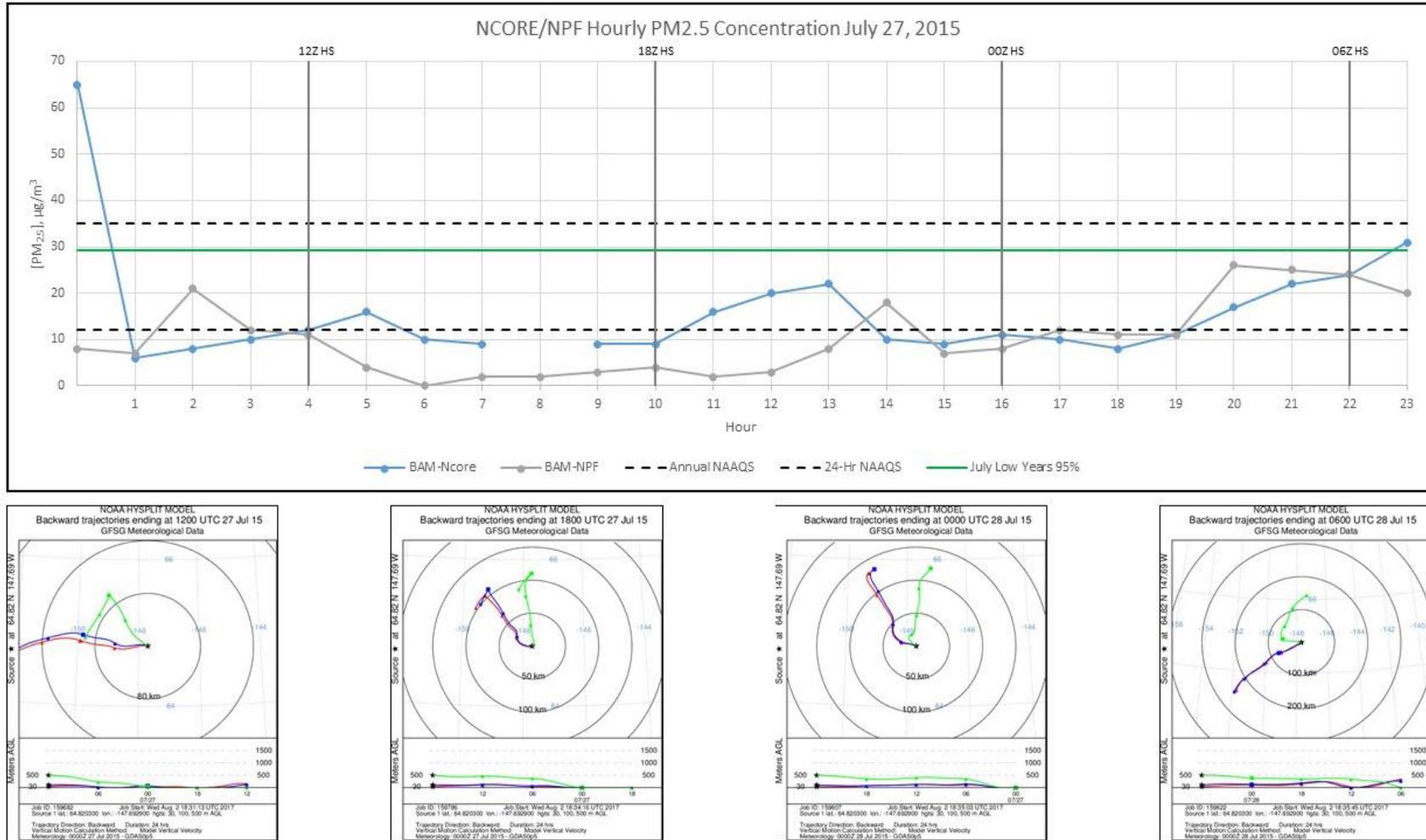


Figure 62. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 27, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 62 depicts higher than normal PM_{2.5}

concentrations throughout the day on July 27, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 15.9 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 10.4 µg/m³.

HYSPPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west and north throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 63.

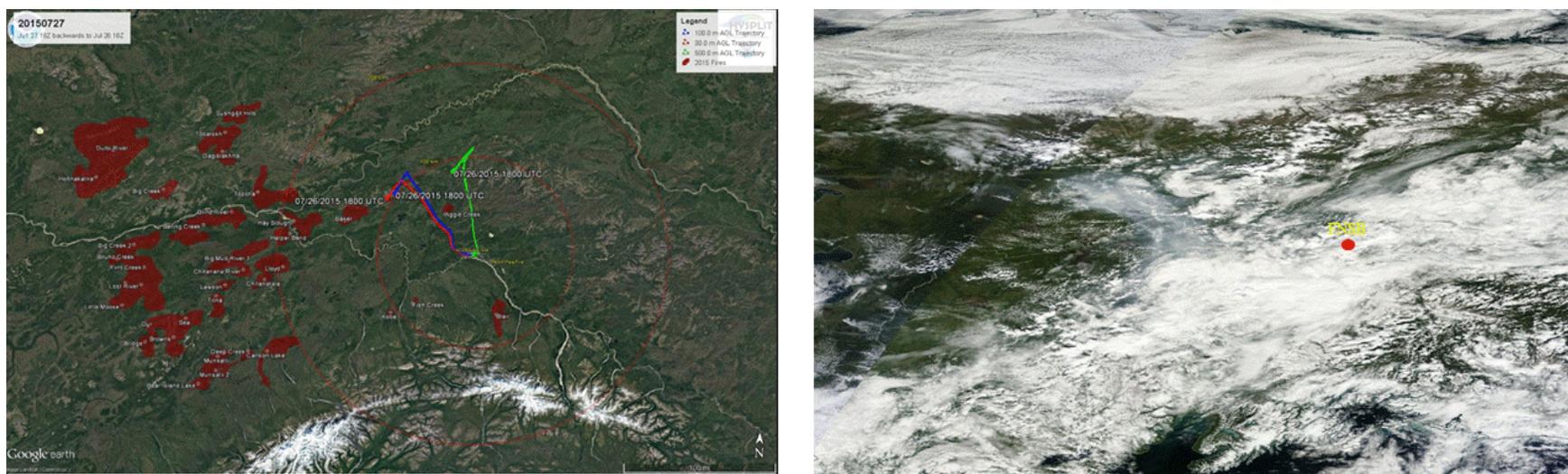


Figure 63. Google Earth with 2015 Fire Perimeters and 27/18Z Hysplit 30m/100m/500m back trajectory. July 27, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 27, 2015 shows the weak stationary boundary over FNSB. The smoke trapped under the clouds dissipated during the day due to rain showers in the area.

Table 35. Hourly observation for Fairbanks International Airport, July 27, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/27/2015 00:53 AKDT	0	0	**	7 (Smoke)	3	57	51
PAFA	07/27/2015 01:53 AKDT	3	180	**	7 (Smoke)	3	57	52
PAFA	07/27/2015 02:53 AKDT	0	0	**	7 (Smoke)	3	57	52
PAFA	07/27/2015 03:53 AKDT	0	0	**	7 (Smoke)	3	55	52
PAFA	07/27/2015 04:53 AKDT	0	0	**	7 (Smoke)	5	55	54
PAFA	07/27/2015 05:53 AKDT	0	0	**	7 (Smoke)	5	55	54
PAFA	07/27/2015 06:53 AKDT	3	40	**	7 (Smoke)	5	55	54
PAFA	07/27/2015 07:53 AKDT	5	50	**	7 (Smoke)	5	57	54
PAFA	07/27/2015 08:53 AKDT	0	0	**	7 (Smoke)	7	58	54
PAFA	07/27/2015 09:53 AKDT	0	0	**	13 (Rain)	8	59	54
PAFA	07/27/2015 10:53 AKDT	5	330	**	**	8	61	54
PAFA	07/27/2015 11:53 AKDT	0	0	**	13 (Rain)	8	59	55
PAFA	07/27/2015 12:53 AKDT	0	0	**	13 (Rain)	8	61	54
PAFA	07/27/2015 13:53 AKDT	3	200	**	**	9	60	54
PAFA	07/27/2015 14:53 AKDT	7	250	**	**	10	61	54
PAFA	07/27/2015 15:53 AKDT	6	240	**	**	10	63	55
PAFA	07/27/2015 16:53 AKDT	8	250	**	13 (Rain)	10	63	55
PAFA	07/27/2015 17:53 AKDT	3	300	**	**	10	64	53
PAFA	07/27/2015 18:53 AKDT	8	240	**	**	10	63	55
PAFA	07/27/2015 19:53 AKDT	0	0	**	(Mod Rain)	7	59	55
PAFA	07/27/2015 20:53 AKDT	0	0	**	**	7	59	57
PAFA	07/27/2015 21:53 AKDT	3	250	**	(Mod Rain)	2	57	54
PAFA	07/27/2015 22:53 AKDT	0	0	**	(Mod Rain)	5	57	54
PAFA	07/27/2015 23:53 AKDT	5	180	**	(Mod Rain)	2	57	55

Surface observations: Table 32 show the morning winds calm winds with a presence of smoke reducing the visibility to 3 miles. As the rain began and intensified during the evening, the smoke was rained out of the atmosphere.

July 28, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 287 fires burning statewide. For the 2015 fire season 4,735,387 acres have been burned, and that is a 24-hr increase of 15,430 acres from the previous day.

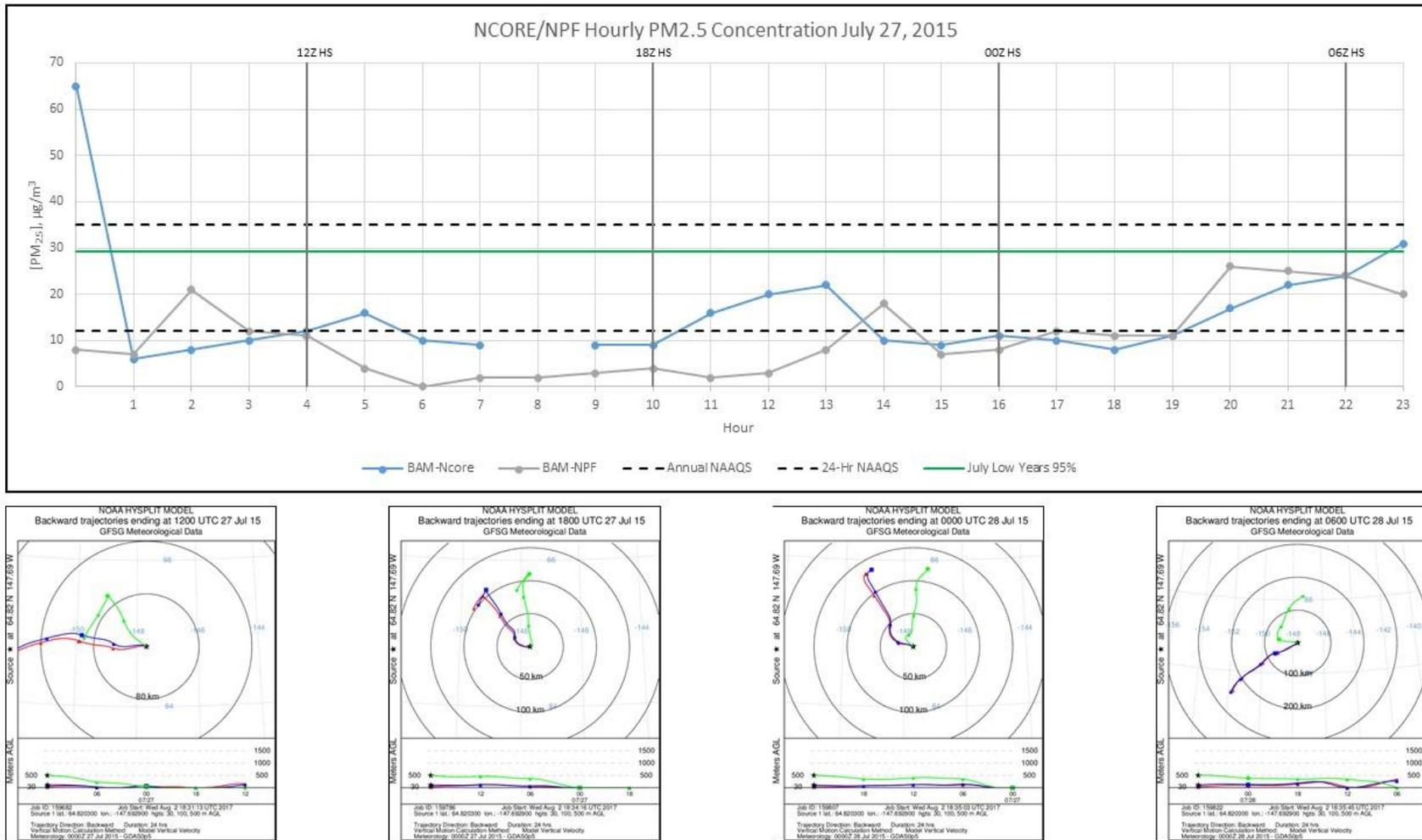


Figure 64. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 28, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 62 depicts higher than normal PM_{2.5}

concentrations throughout the day on July 28, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 22.4 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 19.4 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 65.

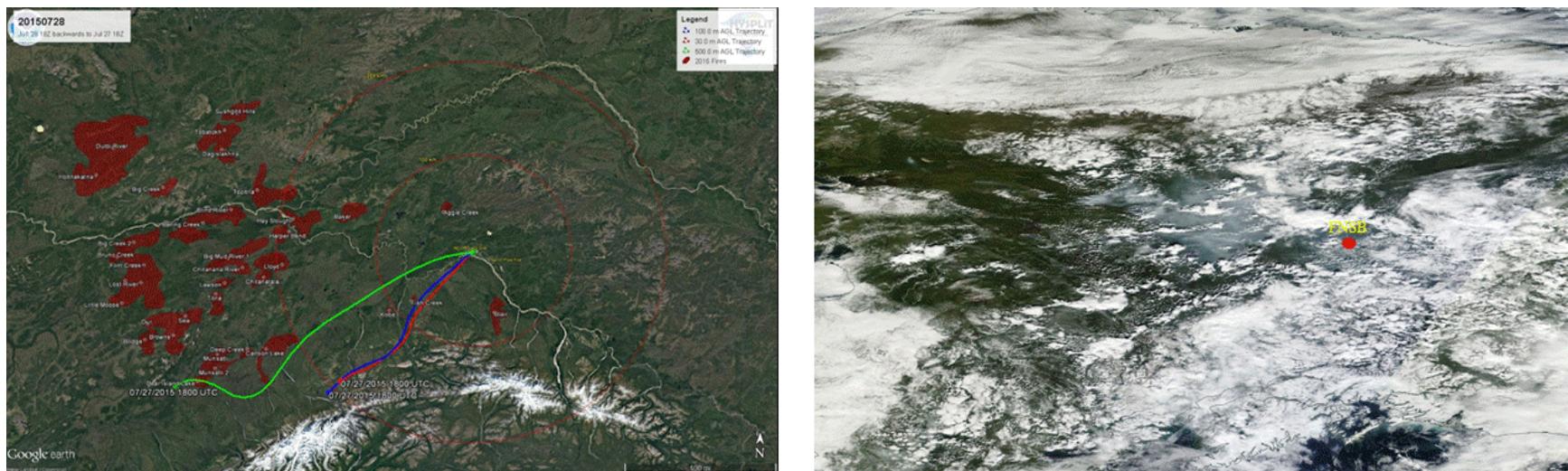


Figure 65. Google Earth with 2015 Fire Perimeters and 28/18Z Hysplit 30m/100m/500m back trajectory. July 28, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 28, 2015 shows the 30m/500m trajectory passing south of the west smoke field.

Table 36. Hourly observation for Fairbanks International Airport, July 28, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFA	07/28/2015 00:53 AKDT	7	250	**	(Mod Rain)	3	55	54
PAFA	07/28/2015 01:53 AKDT	5	230	**	(Mod Rain)	2	56	54
PAFA	07/28/2015 02:53 AKDT	0	0	**	31 (FOG)	2	55	54
PAFA	07/28/2015 03:53 AKDT	3	200	**	31 (FOG)	2	55	53
PAFA	07/28/2015 04:53 AKDT	5	190	**	31 (FOG)	2	54	53
PAFA	07/28/2015 05:53 AKDT	5	220	**	31 (FOG)	3	53	52
PAFA	07/28/2015 06:53 AKDT	0	0	**	31 (FOG)	5	54	52
PAFA	07/28/2015 07:53 AKDT	0	0	**	31 (FOG)	4	55	53
PAFA	07/28/2015 08:53 AKDT	3	190	**	31 (FOG)	4	55	54
PAFA	07/28/2015 09:53 AKDT	3	210	**	31 (FOG)	5	57	54
PAFA	07/28/2015 10:53 AKDT	5	230	**	31 (FOG)	6	57	54
PAFA	07/28/2015 11:53 AKDT	0	0	**	**	7	59	54
PAFA	07/28/2015 12:53 AKDT	0	0	**	**	7	60	53
PAFA	07/28/2015 13:53 AKDT	5	**	**	**	10	63	54
PAFA	07/28/2015 14:53 AKDT	3	**	**	**	10	64	54
PAFA	07/28/2015 15:53 AKDT	0	0	**	**	10	66	54
PAFA	07/28/2015 16:53 AKDT	3	140	**	**	10	66	52
PAFA	07/28/2015 17:53 AKDT	0	0	**	13 (Rain)	10	68	52
PAFA	07/28/2015 18:53 AKDT	5	160	**	13 (Rain)	10	64	52
PAFA	07/28/2015 19:53 AKDT	5	**	**	**	10	61	52
PAFA	07/28/2015 20:53 AKDT	3	140	**	**	10	60	52
PAFA	07/28/2015 21:53 AKDT	0	0	**	13 (Rain)	10	61	54
PAFA	07/28/2015 22:53 AKDT	0	0	**	**	10	57	54
PAFA	07/28/2015 23:53 AKDT	0	0	**	**	10	55	52

Surface observations: Table 33 show light and variable winds with Fog in the morning hours, though no smoke was reported, smoke particles were the main source of condensation nuclei. Water molecules attached to the smoke particles, dropping the visibility down to two miles.

July 29, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 270 fires burning statewide. For the 2015 fire season 4,723,263 acres have been burned, and that is a 24-hr increase of 12,124 acres from the previous day.

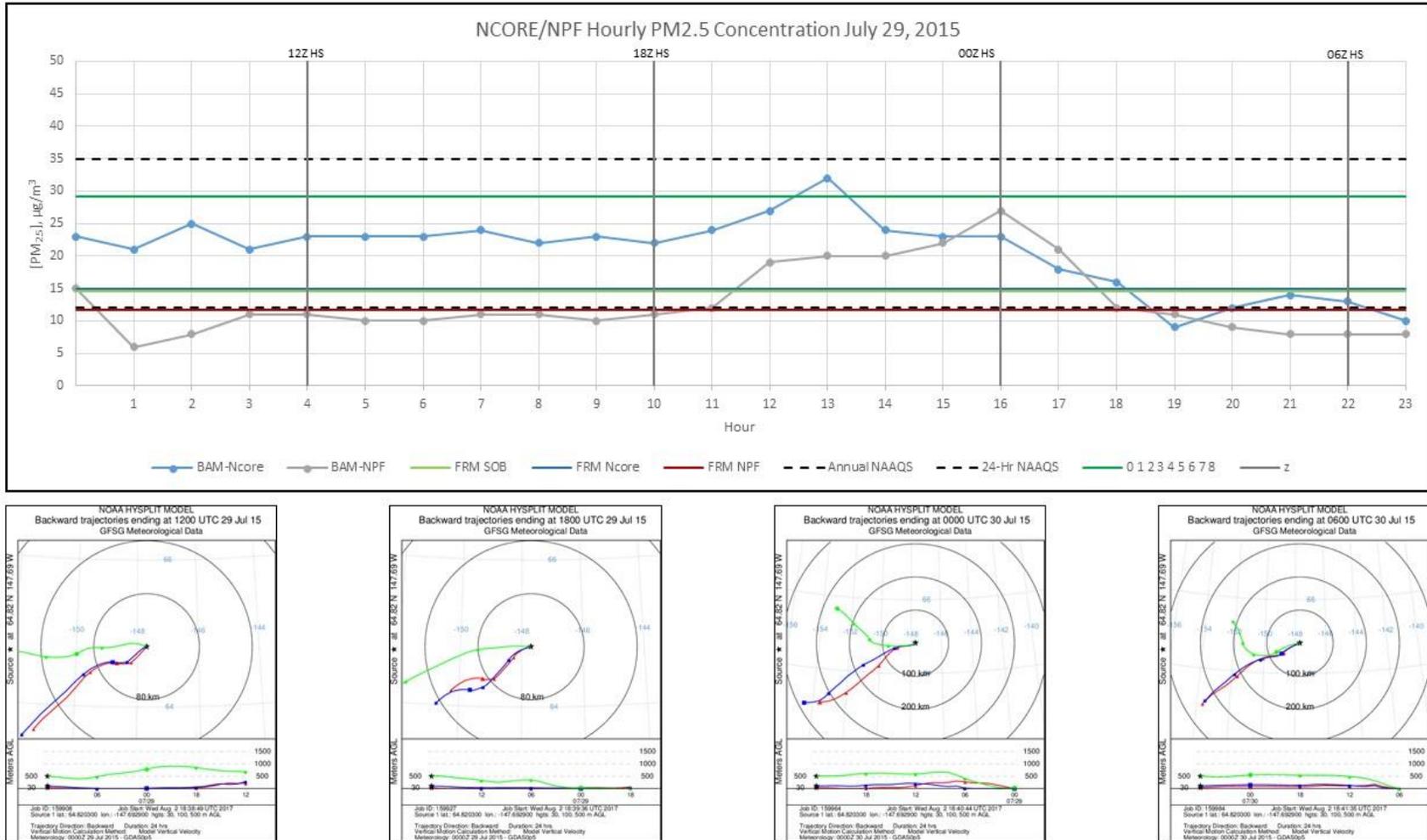


Figure 66. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 29, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 66 depicts higher than normal hourly

PM_{2.5} concentrations throughout the day July 26, 2015. The SOB 24-hour FRM PM_{2.5} concentration was 14.6 µg/m³, NCORE BAM PM_{2.5} 24-hour concentration was 15.0 µg/m³, NCORE 24-hour FRM PM_{2.5} concentration was 11.7 µg/m³, NPF continuous BAM PM_{2.5} 24-hour average concentration was 20.6 µg/m³ and NPF 24-hour FRM PM_{2.5} concentration was 13.0 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west southwest throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 67.

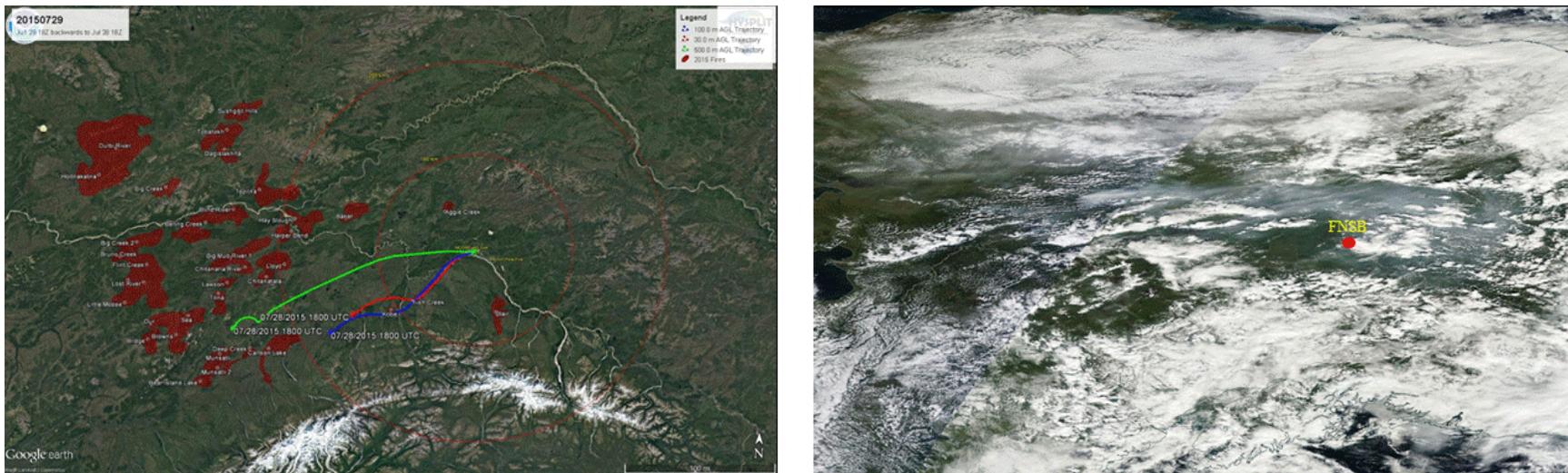


Figure 67. Google Earth with 2015 Fire Perimeters and 29/18Z Hysplit 30m/100m/500m back trajectory. July 29, 2015 MODIS satillite imagery.

MODIS image: Imagery for July 29, 2015 shows very little smoke upstream from FNSB, the highest concentration of smoke continues to be to the north of the area.

Table 37. Hourly observation for Fairbanks International Airport, July 29, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	Conditio n	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/29/2015 00:53 AKDT	5	30	**	**	10	53	51
PAFA	07/29/2015 01:53 AKDT	0	0	**	**	10	54	52
PAFA	07/29/2015 02:53 AKDT	0	0	**	**	10	52	50
PAFA	07/29/2015 03:53 AKDT	0	0	**	**	10	50	48
PAFA	07/29/2015 04:53 AKDT	0	0	**	9 (Fog)	10	50	48
PAFA	07/29/2015 05:53 AKDT	0	0	**	9 (Fog)	4	50	49
PAFA	07/29/2015 06:53 AKDT	5	50	**	9 (Fog)	6	51	49
PAFA	07/29/2015 07:53 AKDT	3	70	**	**	7	52	48
PAFA	07/29/2015 08:53 AKDT	0	0	**	**	7	52	48
PAFA	07/29/2015 09:53 AKDT	0	0	**	**	7	54	50
PAFA	07/29/2015 10:53 AKDT	0	0	**	13 (Rain)	7	56	50
PAFA	07/29/2015 11:53 AKDT	0	0	**	13 (Rain)	6	55	52
PAFA	07/29/2015 12:53 AKDT	0	0	**	**	7	59	54
PAFA	07/29/2015 13:53 AKDT	3		**	**	10	63	52
PAFA	07/29/2015 14:53 AKDT	0	0	**	**	10	64	50
PAFA	07/29/2015 15:53 AKDT	0	0	**	**	10	67	52
PAFA	07/29/2015 16:53 AKDT	6	110	**	**	10	70	52
PAFA	07/29/2015 17:53 AKDT	5	130	**	**	10	68	52
PAFA	07/29/2015 18:53 AKDT	7	300	**	13 (Rain)	10	57	51
PAFA	07/29/2015 19:53 AKDT	6	10	**	13 (Rain)	10	58	53
PAFA	07/29/2015 20:53 AKDT	3	20	**	**	10	59	54
PAFA	07/29/2015 21:53 AKDT	0	0	**	**	10	58	53
PAFA	07/29/2015 22:53 AKDT	0	0	**	13 (Rain)	10	57	52
PAFA	07/29/2015 23:53 AKDT	0	0	**	**	10	55	52

Surface observations: Table 34 show light and variable winds with Fog in the morning hours, though no smoke was reported, smoke particles were the main source of condensation nuclei. Water molecules attached to the smoke particles, dropping the visibility down to four miles. Rain in the later part of the day helped clear out remaining smoke particles.

July 30, 2015 is not included as part of this event, the Annual NAAQS was not exceeded. Convective activity and rain showers cleaned the atmosphere. The winds increased after the showers subsided, advecting smoke into the FNSB area increasing PM_{2.5} concentrations July 31, 2015.

July 31, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 259 fires burning statewide. For the 2015 fire season 4,810,715 acres have been burned, and that is a 24-hr increase of 31,874 acres from the previous day.

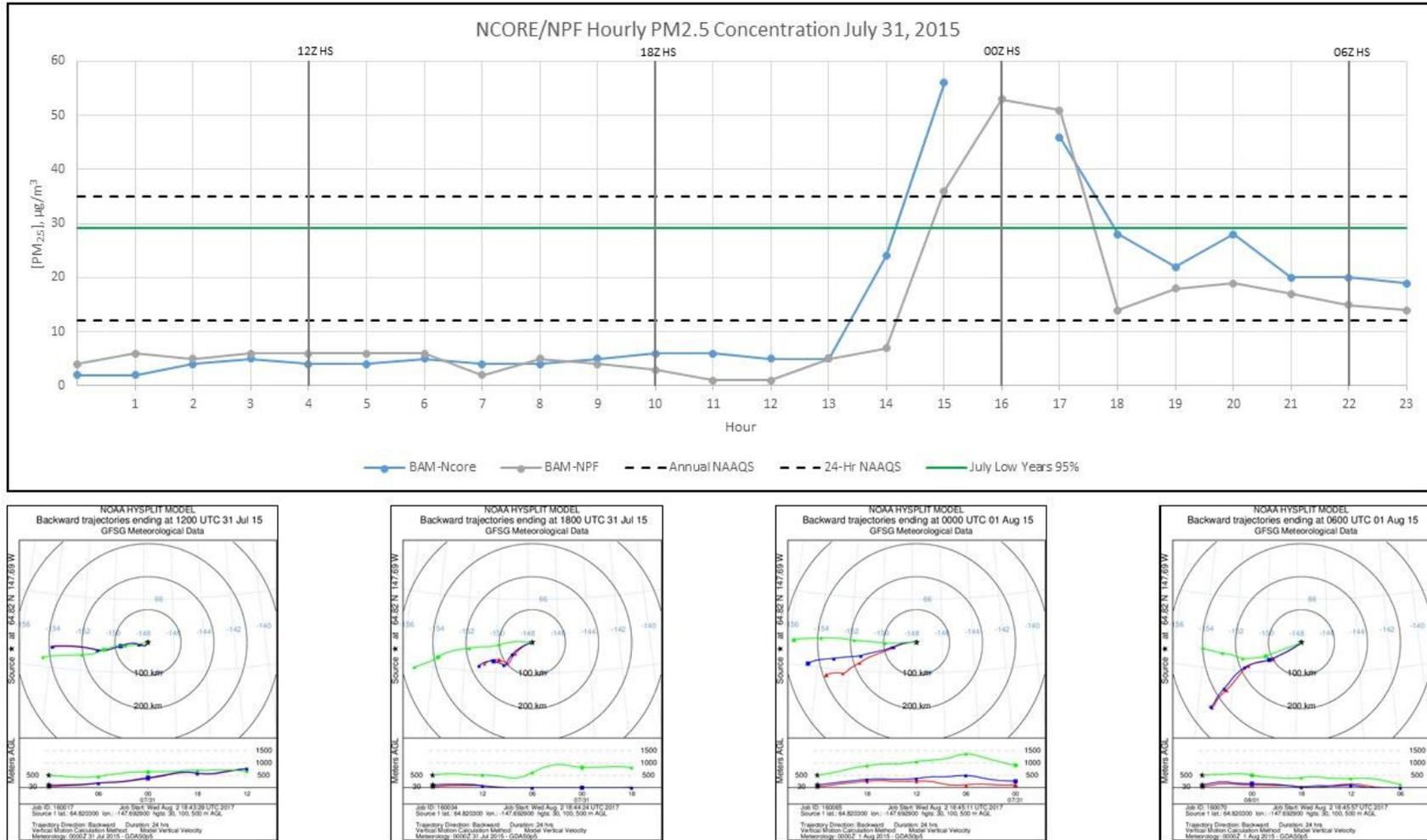


Figure 68. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for July 31, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 68 depicts higher than normal PM_{2.5}

concentrations throughout the day on July 31, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM PM_{2.5} 24-hour concentration was 14.1 µg/m³, and NPF continuous BAM PM_{2.5} 24-hour average concentration was 12.7 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 69. Fires to the west are still active filling the interior with smoke.

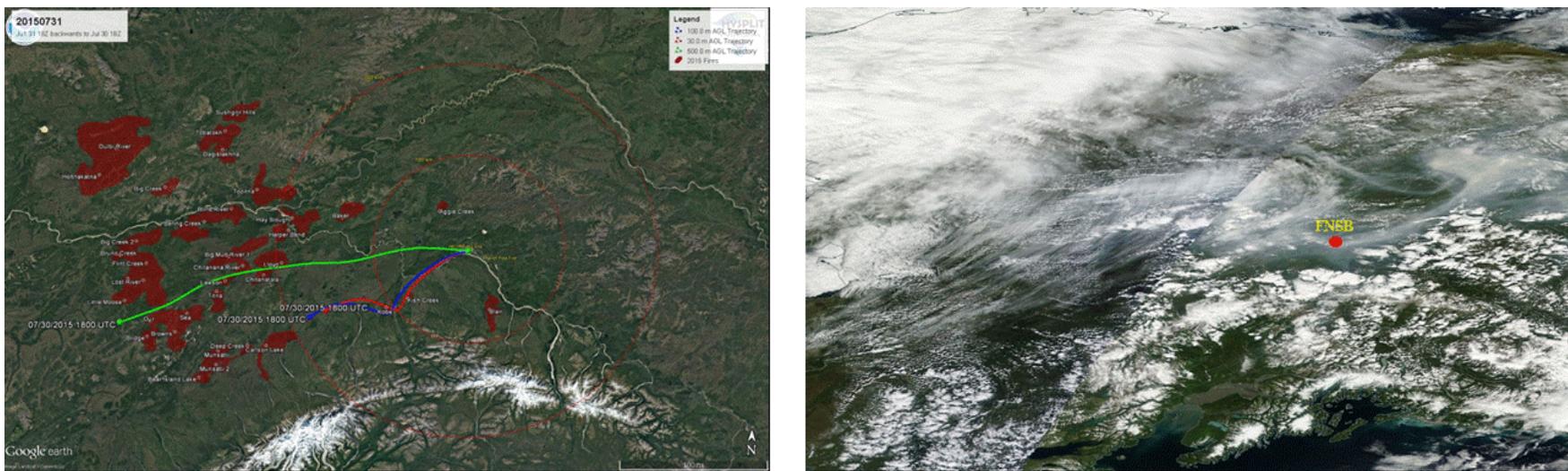


Figure 69. Google Earth with 2015 Fire Perimeters and 31/18Z Hysplit 30m/100m/500m back trajectory. July 31, 2015 MODIS satellite imagery.

MODIS image: Imagery for July 31, 2015 shows the 30m/500m trajectory passing directly through the smoke field to the west of FNSB.

Table 38. Hourly observation for Fairbanks International Airport, July 31, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/31/2015 00:53 AKDT	0	0	**	**	10	54	52
PAFA	07/31/2015 01:53 AKDT	0	0	**	**	10	52	50
PAFA	07/31/2015 02:53 AKDT	0	0	**	**	10	53	50
PAFA	07/31/2015 03:53 AKDT	3	40	**	**	10	52	48
PAFA	07/31/2015 04:53 AKDT	5	40	**	**	10	52	48
PAFA	07/31/2015 05:53 AKDT	0	0	**	**	10	51	50
PAFA	07/31/2015 06:53 AKDT	0	0	**	**	10	52	48
PAFA	07/31/2015 07:53 AKDT	5	30	**	**	10	54	48
PAFA	07/31/2015 08:53 AKDT	0	0	**	**	10	54	48
PAFA	07/31/2015 09:53 AKDT	0	0	**	**	10	55	50
PAFA	07/31/2015 10:53 AKDT	0	0	**	**	10	57	50
PAFA	07/31/2015 11:53 AKDT	0	0	**	**	10	59	51
PAFA	07/31/2015 12:53 AKDT	0	0	**	**	10	62	51
PAFA	07/31/2015 13:53 AKDT	0	0	**	**	10	66	52
PAFA	07/31/2015 14:53 AKDT	0	0	**	**	10	68	51
PAFA	07/31/2015 15:53 AKDT	5	190	**	**	10	68	50
PAFA	07/31/2015 16:53 AKDT	3	170	**	**	7	68	52
PAFA	07/31/2015 17:53 AKDT	0	0	**	7 (Smoke)	6	70	52
PAFA	07/31/2015 18:53 AKDT	3	120	**	7 (Smoke)	6	69	52
PAFA	07/31/2015 19:53 AKDT	9	200	**	**	7	67	50
PAFA	07/31/2015 20:53 AKDT	5	200	**	**	7	66	52
PAFA	07/31/2015 21:53 AKDT	5	210	**	**	9	63	52
PAFA	07/31/2015 22:53 AKDT	0	0	**	**	10	62	54
PAFA	07/31/2015 23:53 AKDT	0	0	**	**	10	59	54

Surface observations: Table 35 show the winds gradually increase in late afternoon, this increased westerly wind speed advected smoke into the FNSB area.

August 1 through August 9, 2015 are not included as part of this event, the Annual NAAQS was not exceeded. A well-developed frontal system passed through interior Alaska August 1, 2015 dousing the fires and raining out the smoke from the atmosphere. As the fuels dried, smoke began to pool, and as the wind speeds increased during afternoon hours, smoke was pushed towards FNSB. PM_{2.5} concentrations climbed back above the Annual NAAQS August 8, 2015.

August 8, 2015

AICC Report Fire Information: There were 2 new fires reported for a total of 244 fires burning statewide. For the 2015 fire season 5,025,115 acres have been burned, and that is a 24-hr increase of 12,062 acres from the previous day.

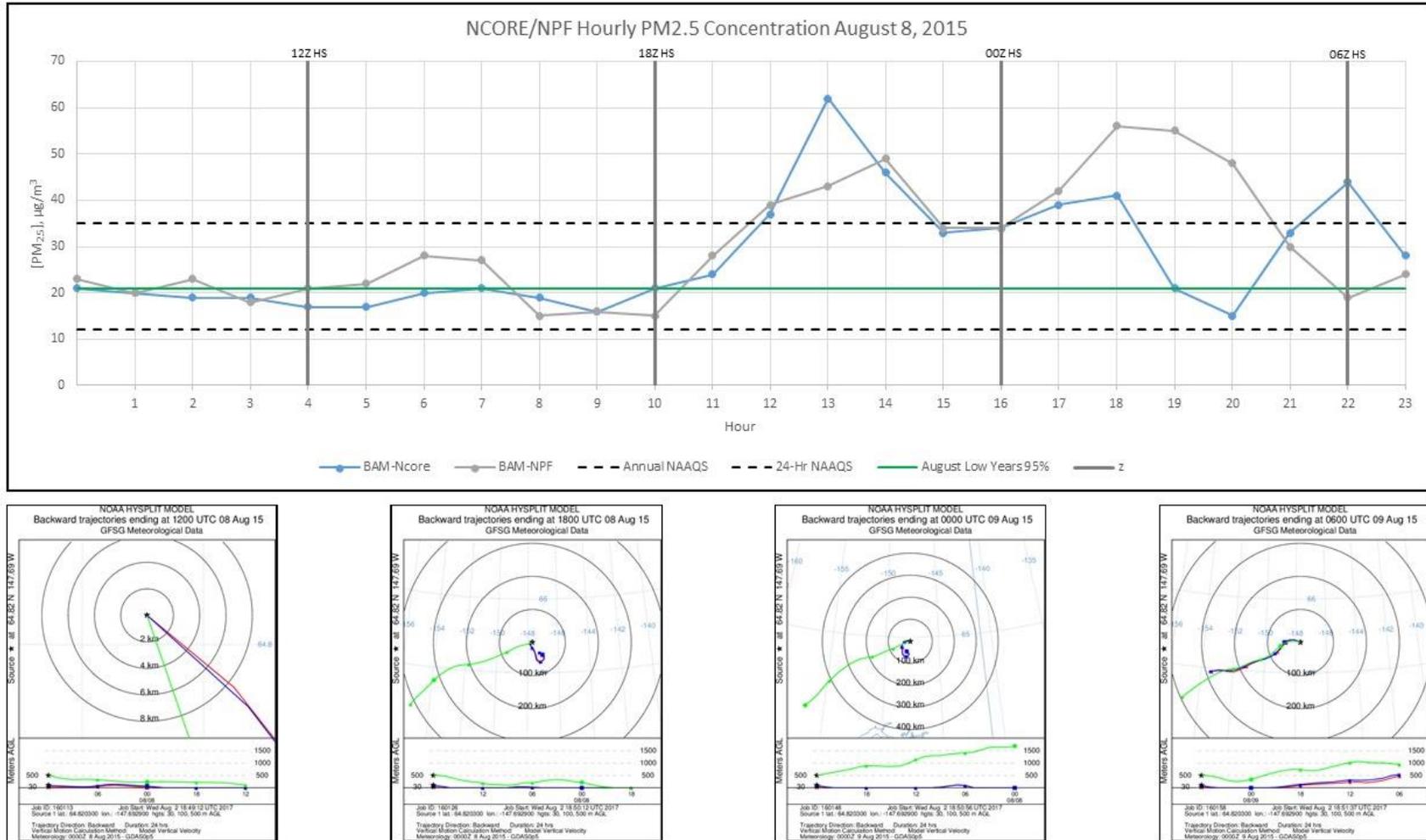


Figure 70. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr Hysplit runs for August 8, 2015

PM_{2.5} Data: Note: Data procedures are described in the Introduction section above. Figure 68 depicts higher than normal PM_{2.5}

concentrations throughout the day on August 8, 2015. This was not a 1-in-6 or 1-in-3 run day so the primary NCORE 24-hour FRM, primary NPF 24-hour FRM, secondary NPF 24-hour BAM, and SOB 24-hour FRM are not available for this date. The NCORE BAM $PM_{2.5}$ 24-hour concentration was $22.8 \mu\text{g}/\text{m}^3$, and NPF continuous BAM $PM_{2.5}$ 24-hour average concentration was $30.4 \mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates a flow at the 30M/100M/500M levels from the west throughout the day. The 18Z Hysplit run has been overlaid on the Google Earth image, Figure 71.

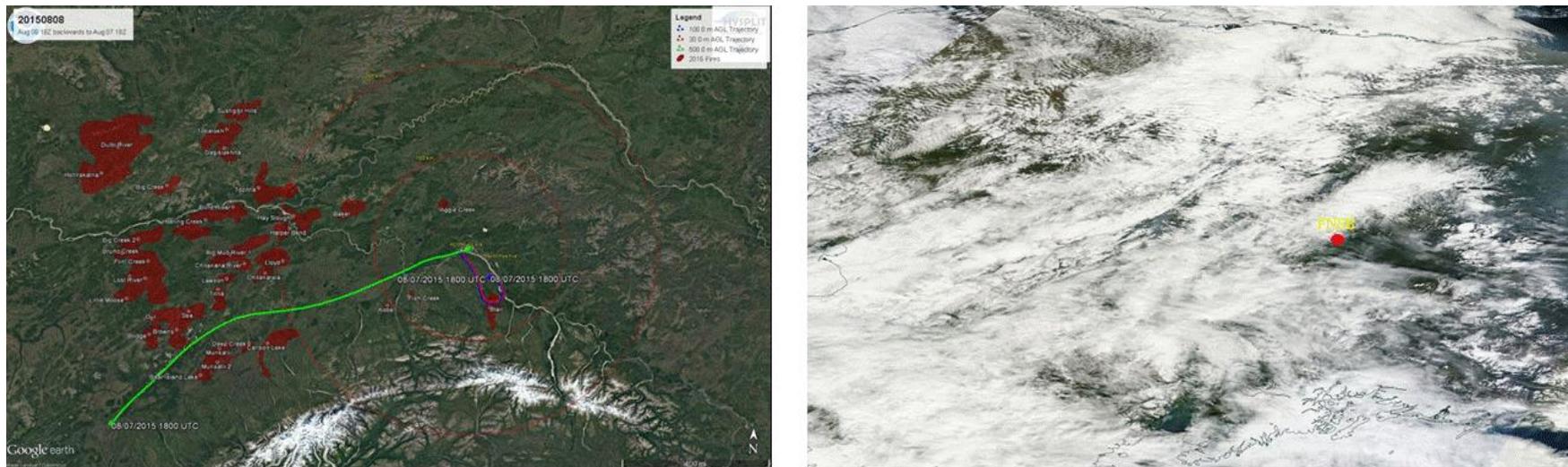


Figure 71. Google Earth with 2015 Fire Perimeters and 08/18Z Hysplit 30m/100m/500m back trajectory. August 8, 2015 MODIS satelllite imagery.

MODIS image: Imagery for August 8, 2015 shows the 500m trajectory passing to the south of the western fire complex. The fires are still smoldering, producing low level smoke that is trapped below the current clouds.

Table 39. Hourly observation for Fairbanks International Airport, August 08, 2015

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	08/08/2015 00:53 AKDT	3	10	**	**	10	55	48
PAFA	08/08/2015 01:53 AKDT	0	0	**	**	10	52	48
PAFA	08/08/2015 02:53 AKDT	6	40	**	**	10	51	46
PAFA	08/08/2015 03:53 AKDT	3	20	**	**	10	52	46
PAFA	08/08/2015 04:53 AKDT	0	0	**	**	10	53	47
PAFA	08/08/2015 05:53 AKDT	5	80	**	**	10	54	48
PAFA	08/08/2015 06:53 AKDT	0	0	**	**	10	53	49
PAFA	08/08/2015 07:53 AKDT	3	50	**	**	10	54	47
PAFA	08/08/2015 08:53 AKDT	0	0	**	**	10	55	46
PAFA	08/08/2015 09:53 AKDT	0	0	**	**	10	57	48
PAFA	08/08/2015 10:53 AKDT	0	0	**	**	10	61	48
PAFA	08/08/2015 11:53 AKDT	0	0	**	**	10	63	48
PAFA	08/08/2015 12:53 AKDT	0	0	**	**	8	66	50
PAFA	08/08/2015 13:53 AKDT	3	**	**	7 (Smoke)	5	68	50
PAFA	08/08/2015 14:53 AKDT	3	180	**	7 (Smoke)	4	69	49
PAFA	08/08/2015 15:53 AKDT	3	200	**	7 (Smoke)	6	72	50
PAFA	08/08/2015 16:53 AKDT	6	190	**	7 (Smoke)	6	70	50
PAFA	08/08/2015 17:53 AKDT	5	250	**	7 (Smoke)	6	70	54
PAFA	08/08/2015 18:53 AKDT	9	290	**	7 (Smoke)	6	68	52
PAFA	08/08/2015 19:53 AKDT	7	310	**	7 (Smoke)	6	68	51
PAFA	08/08/2015 20:53 AKDT	9	350	**	**	10	65	50
PAFA	08/08/2015 21:53 AKDT	6	330	**	**	6	63	51
PAFA	08/08/2015 22:53 AKDT	8	360	**	**	6	61	52
PAFA	08/08/2015 23:53 AKDT	7	360	**	**	8	59	52

Surface observations: Table 36 show the winds gradually increase in late afternoon, this increased westerly wind speed advected smoke into the FNSB area.

Summary of the June/July/August Event Period

The late June/July, early August event can be best summarized as sustained westerly wind flow and the large complex of fires in the interior of Alaska. The predominantly west-southwest wind flow was the primary cause of smoke advecting into the Fairbanks North Star Borough throughout the summer fire season. The smoke, and therefore the PM_{2.5} concentrations, during this period also varied due to the increases and decreases in fire spread, suppression efforts, and shallow, surface-based inversions. Smoke continued in the area through the period and resulted in multiple 24-hr and annual PM_{2.5} NAAQS exceedances.

Reasonable Controls

ADEC continues to work closely with the Alaska Fire Service, the AICC, and the Fire Weather Forecasters to ensure Air Quality Advisory Notifications are sent to the public as rapidly as possible. In-place procedures allow ADEC to send Air Quality Advisories via Twitter and email, greatly reducing the time required to contact government agencies and the general public. See Appendix B, Advisories

ADEC, the federal land management agencies, and Alaskan tribes developed an interagency plan, the Alaska Interagency Wildland Fire Management Plan (AIWFMP), to address controlling wildland fires. The AIWFMP requires an annual, pre-season land manager(s)/owner(s) review of the fire protection needs on lands under their management authority. In addition, responsibilities and actions taken to mitigate impacts of wildland fire smoke are outlined in the “Alaska’s Enhanced Smoke Management Plan for Prescribed Fire, Procedures Manual June 3, 2015”, <http://dec.alaska.gov/air/anpms/rh/rhdoc2/Appendix-III.K.8.pdf>. The purpose of the Enhanced Smoke Management Plan (ESMP) is to provide a clear and equitable regulatory basis for smoke management in Alaska. The ESMP also outlines procedures for monitoring ambient air quality in the event of a wildland fire.

Procedural Requirements

In accordance with the exceptional events rule 40 CFR §50.14, twenty nine data points in 2015 (June 18-29, July 1-9, July 14, July 24-29, July 31, and August 8) were flagged in the state’s AQS data submission. ADEC requests that EPA exclude these flagged data points when determining compliance with the PM_{2.5} NAAQS for the Fairbanks State Office Building, NCORE, and North Pole Fire sites. In accordance with the mitigation requirement 40 CFR 51.930(a)(1), ADEC posted the Exceptional Events Waiver Request public notice draft for comment, January 11, 2018. Public comment period closed February 12, 2018 with no comments received.

Conclusions

This document describes the wildland fires in Alaska in the summer of 2015 by location and acreage burned. The cause of the major fires was lightning ignition of very dry fuels caused by

drought conditions. Large fires do not occur unless meteorological and fuel conditions are favorable, which occurs frequently during summer months in Interior Alaska.

The smoke from these fires impacted the FNSB and resulted in multiple days of increased smoke and PM_{2.5} concentrations. These smoke impacted, natural event data should not be used in the determination of compliance with the NAAQS for FNSB. It is clear that without the wildland fires, the PM_{2.5} concentrations at Fairbanks NCORE, Fairbanks SOB and North Pole's NPF sites would have been much lower. Data from low fire years provide an estimate of background summer time PM_{2.5} concentrations in the range of 0.7-19.9 µg/m³, with the 95th percentile at 26.6 µg/m³.

These wildland fires will reoccur and are not controllable. State of Alaska ESMP and Air Quality Advisory procedures adequately cover actions to be taken when these events occur.

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Abbreviations

AICC	Alaska Interagency Coordination Center
BL	Boundary Layer
GDAS	Global Data Assimilation System
GFS	Global Forecast System
HYSPLIT	HYbrid Single-Particle Lagrangian Integrated Trajectory
MODIS	Moderate Resolution Imaging Spectroradiometer satellite imagery
NCEP	National Centers for Environmental Prediction
AIWFMP	Alaska Interagency Wildland Fire Management Plan
NAAQS	National Ambient Air Quality Standard
FNSB	Fairbanks North Star Bough
FRM	Federal Reference Method
FEM	Federal Equivalent Method
WD	Wind Direction
WS	Wind Speed